Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

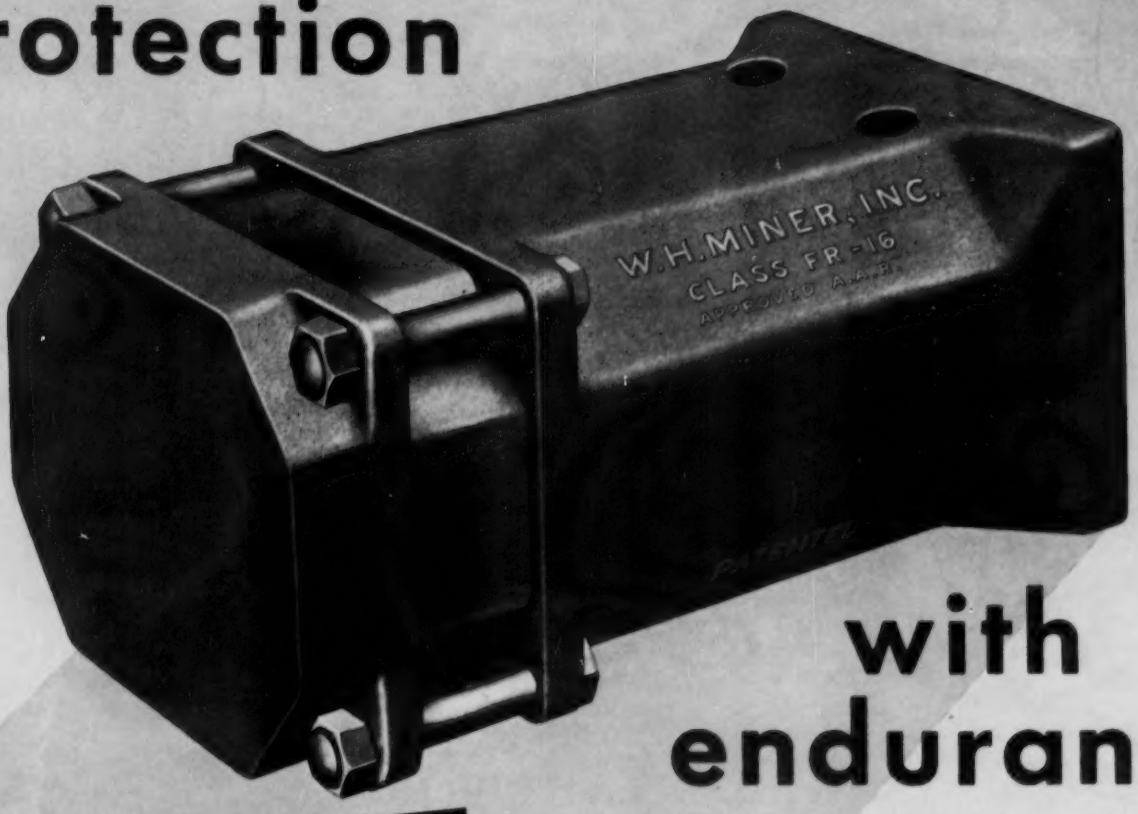
MARCH 1956

One of Five Specialized Railway Age Publications

PROTECTING MORE AND MORE CARS

WITH INEXHAUSTIBLE ENDURANCE

protection

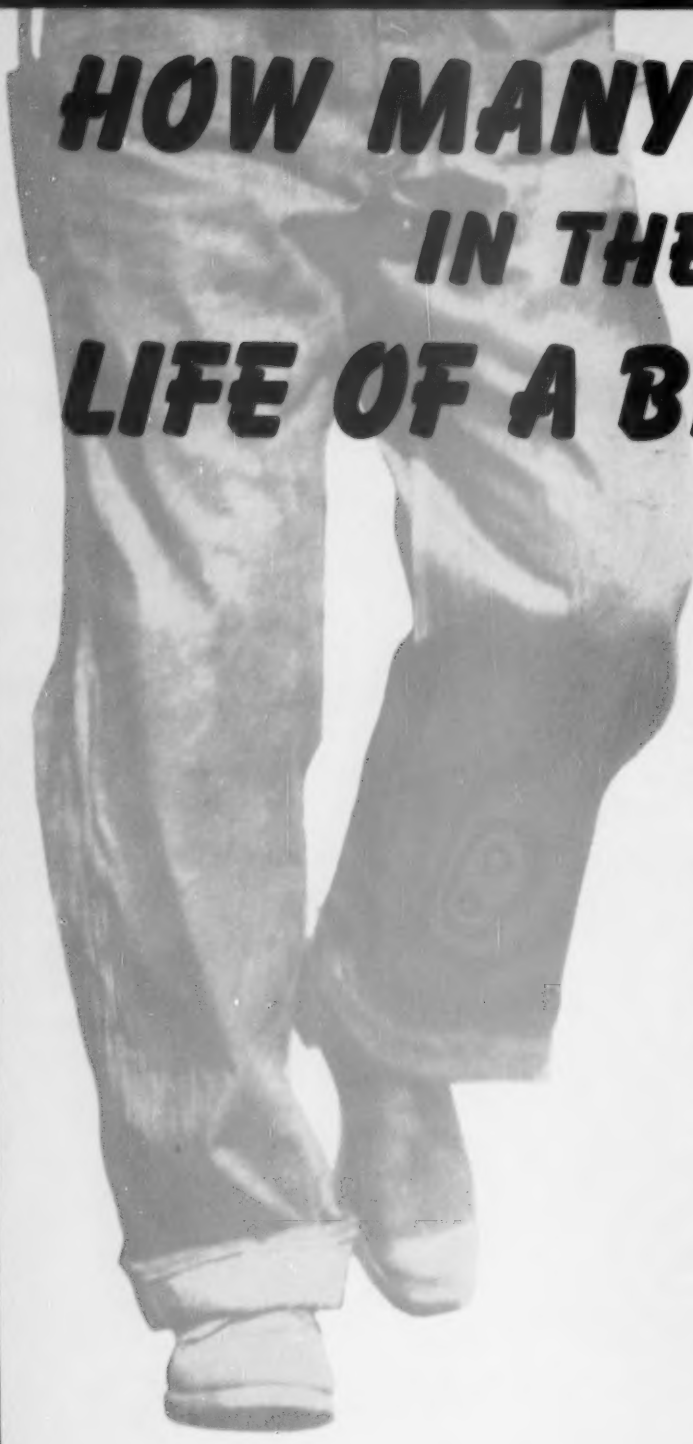


with endurance

MINER FR-16 RUBBER DRAFT GEAR

W. H. MINER, INC.
CHICAGO

HOW MANY STEPS IN THE LIFE OF A BRAKE BEAM?



The railroads use millions of time-consuming, money-wasting steps each year carrying freight car brake beams into reclamation plants for dismantling and reassembling—then back again to the stores department.

Truslock cuts the number of those steps right in half!

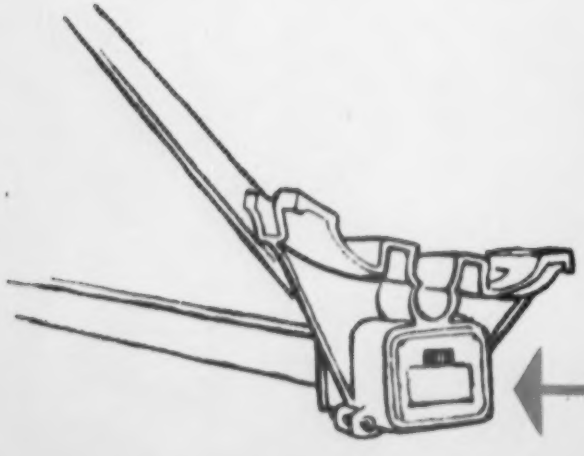
Here's why—

Worn or damaged brake heads account for at least half of the brake beams coming into reclamation plants. It stands to reason that a brake beam equipped with a quick-change brake head—replaceable in a jiffy without special tools or the need to disassemble the brake beam—will cut your reclamation costs by fifty percent.

Economical maintenance is only one of the many TRUSLOCK features that have sold this premium brake beam to 72 railroads and private car lines.

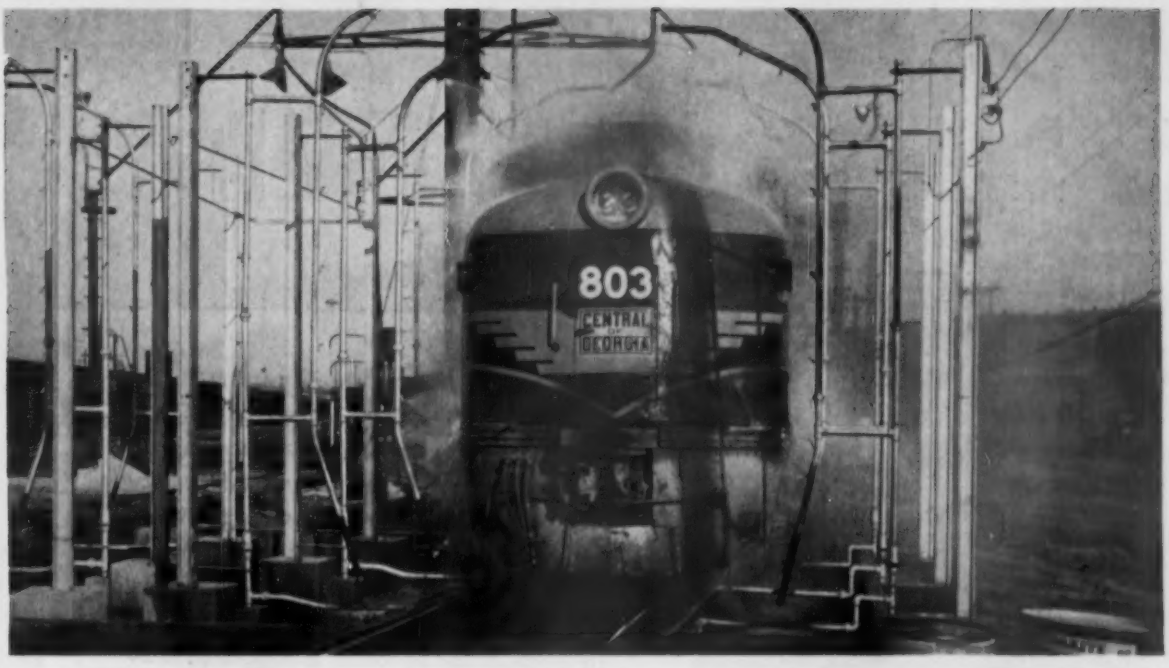
YOUR FIRST BRAKE HEAD CHANGE ON A TRUSLOCK WILL SAVE YOU MORE THAN THE SMALL PREMIUM YOU PAY FOR THIS TOP-PERFORMANCE BRAKE BEAM . . . MAKES TRUSLOCK THE LOWEST COST NO. 18 BRAKE BEAM YOU CAN BUY.

BUFFALO BRAKE BEAM COMPANY
NEW YORK • BUFFALO



TRUSLOCK

The Buffalo Brake Beam with the Quick-Change Brake Head

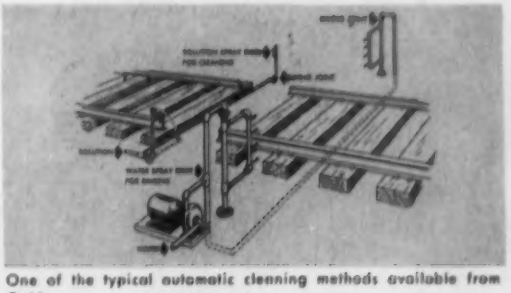


Original pressure-spray cleaning by Oakite cuts equipment-washing costs

Almost TEN years ago, Oakite FIRST pioneered the so-called pressure-spray system of cleaning and rinsing locomotive running gear and passenger cars. Today, many leading railroads are using this dependable Oakite system as standard procedure.

Above, you see the Oakite system in action. This sturdy washing unit was built to specifications from Oakite blueprints. Entire unit was fabricated in the railroad's own shops.

Today, you can cut your equipment-washing costs by specifying Oakite pressure-spray cleaning and rinsing systems and by selecting any one of a wide variety of specialized Oakite cleaning compounds.



One of the typical automatic cleaning methods available from Oakite.

Drawings and data of time-proved Oakite pressure system cleaning are yours for the asking. Drop a line to Oakite Products, Inc., (Railway Division) 46 Rector Street, New York 6, N.Y.

Oakite gives you the IMPORTANT advantage ... LOW-COST END RESULTS!

SPECIALIZED INDUSTRIAL CLEANING

OAKITE®

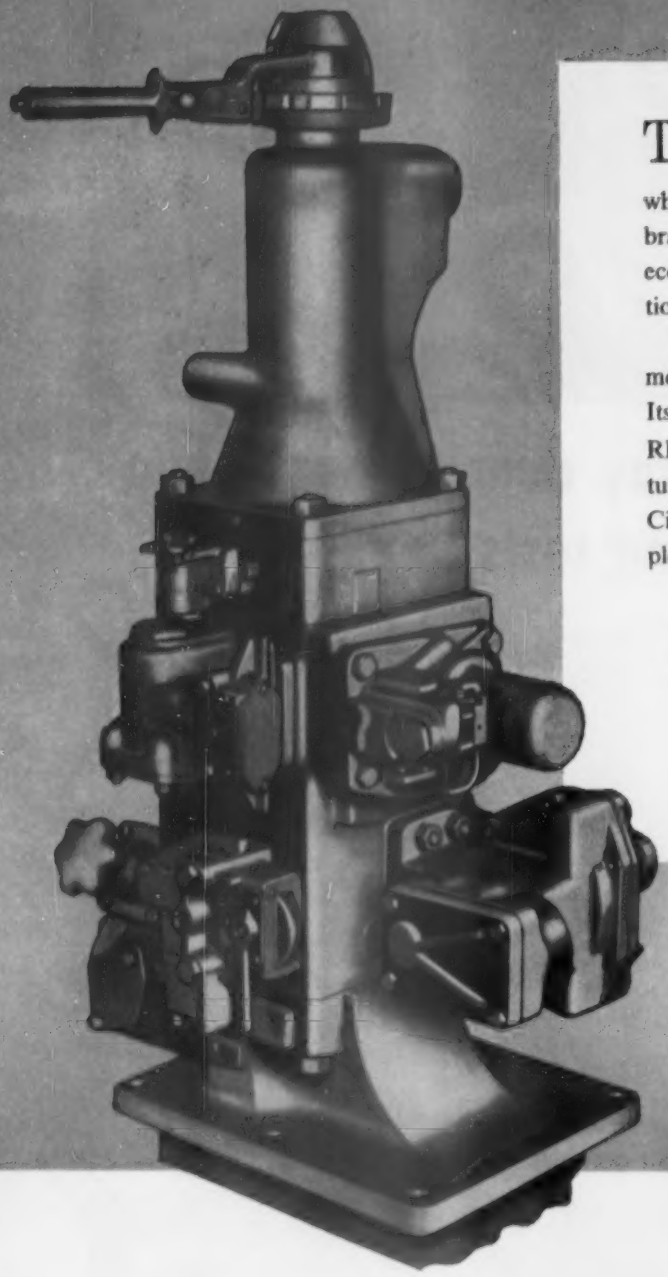
MATERIALS · METHODS · SERVICE

Export Division Cable Address: Oakite

SCIENCE

RAILWAY DIVISION

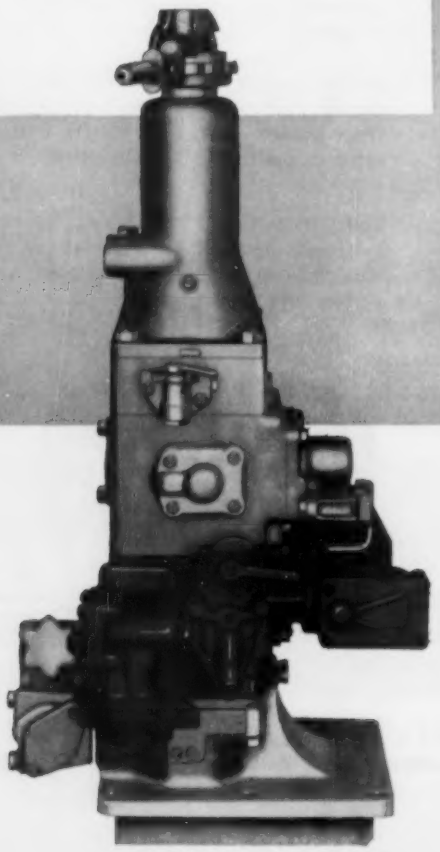
NEW DS-24-M BRAKE VALVE for 24 RL Road Locomotive Brake



THIS type brake valve incorporates the brake pipe pressure maintaining feature which offers *pronounced improvement* in train brake operation plus *outstanding maintenance* economies arising from more uniform distribution of braking throughout the train.

The D-24-M Brake Valve is the recommended standard for 24 RL Brake Equipment. Its functions can be readily incorporated in 24 RL Brake Valves now in service by substituting a conversion filling piece. Write for our Circular Notice No. 1130 which gives complete details.

Conversion Filling Piece, shown in color below, for existing D-24 Type Brake Valves. It provides all the brake pipe pressure maintaining features of the DS-24-M Brake Valve.



Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PENNA.

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Founded in 1832 as the American Rail-Road Journal

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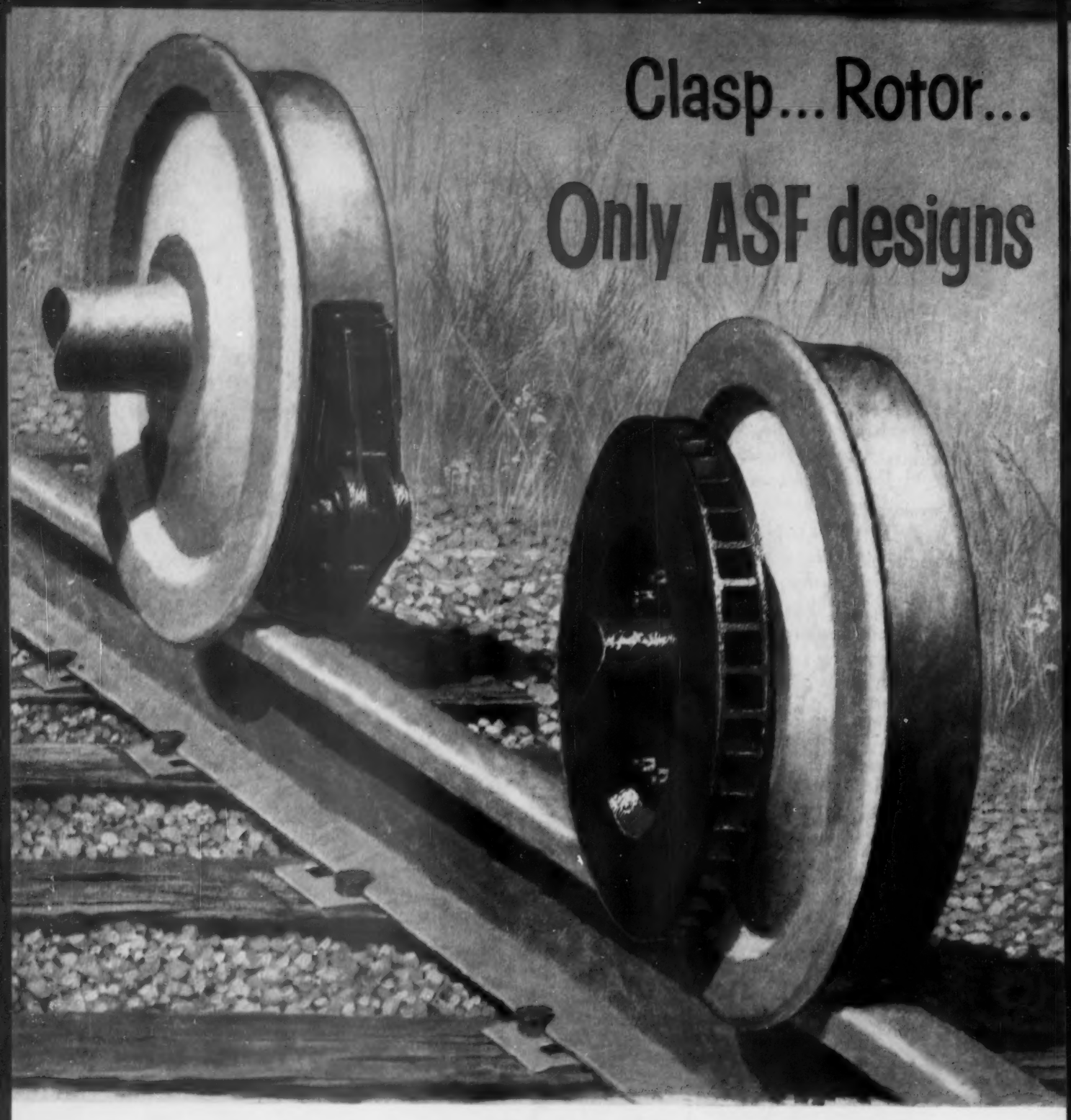
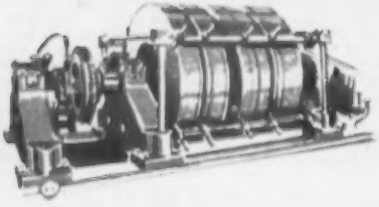
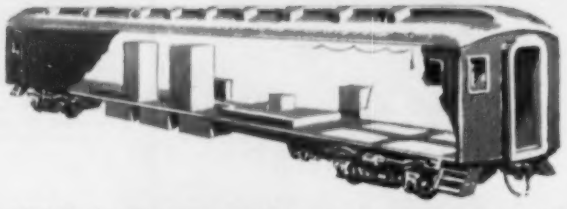


ONLY ASF IS EQUIPPED TO DEVELOP AND BUILD ALL THREE



ASF Brake Test Dynamometer permits close-range laboratory study of braking action . . . This unique machine can duplicate the stresses and kinetic energy of stops from 150 mph on down—service or emergency—as well as low or high speed drags.



ASF Brake Test Car furnishes final, on-line proof of brake design and brake performance . . . Over 1800 brakeway stops have been made to date with this ASF car—fitted at various times with ASF clasp, rotor and combination brakes.

or Combination

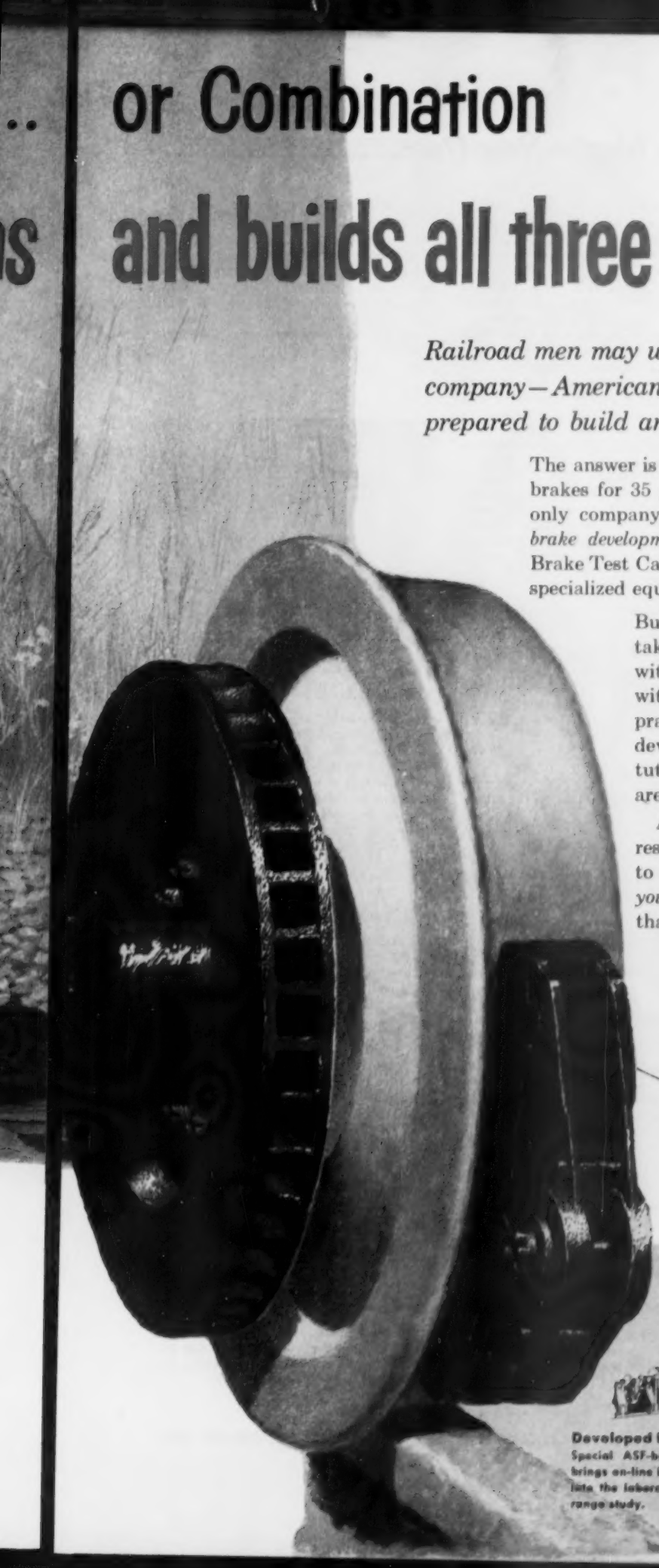
and builds all three types of brakes

Railroad men may well ask why only one company—American Steel Foundries—is prepared to build any type of brake.

The answer is *experience.* Not just the experience of *building* brakes for 35 years, but the kind that comes from being the only company equipped to do a thorough, objective job of *brake development.* The Brake Dynamometer and the ASF Brake Test Car, shown on the opposite page, are typical of the specialized equipment it takes to do that job.

But it takes more than specialized equipment. It takes men with the skill to design such equipment, with the technical background to use it properly, with the experience to interpret research data in practical terms. There's no easy way to design and develop many different types of brakes; no substitute for testing each brake under conditions that are identical with on-line train operation.

Ask your ASF Representative to show you the results of these on-line tests. That's the sure way to find the type of brake with the characteristics *you* want. Only at ASF can you *choose* the brake that's right for your road.



ASF

AMERICAN STEEL FOUNDRIES

Prudential Plaza, Chicago 1, Illinois

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Look for the MINT MARK of fine products

Developed by Research
Special ASF-built machinery brings on-line brake problems into the laboratory for close-range study.

Tested On-Line . . .
The completely equipped ASF Test Car serves as a "proving ground" for new developments in brakes.

Proved in Service . . .
Far more passenger cars are equipped with ASF-built brakes than with all other makes combined!

EQUIPMENT... *New Ideas—New Uses*

Motive Power Batteries

Exide-Powerclad, a line of flat-plate motive-power batteries, complement the Exide line of tubular plate industrial batteries. They are described as premium type with triple insulation and are suitable for use in industrial fork and lift trucks and for mine locomotive and marine applications.

The positive plate grids are constructed of Silvium, a corrosion-resistant alloy. Vitrex and perforated polyvinyl chloride retainers, a polyethylene insulating strip and a deeply grooved microporous rubber separator are used to achieve positive plate insulation. *Department PC, Exide Industrial Division, Electric Storage Battery Company, Box 8109, Philadelphia 1.*

High Potential Tester

The model mobile d-c Hypot 469 has an output of 0.70 KV, d-c at 2.5 milliamperes The unit was primarily designed for acceptance and proof testing of cables rated up to 15 KV, but is equally applicable to rotating machinery, switchgear and transformers. The tester is housed in a steel case 29x23x18 in. and mounted on semi-pneumatic rubber-tired wheels. It is furnished with 10 ft of high-voltage cable to terminate output. A plug and socket arrangement is furnished so that cable may be disconnected and stored on rack in back of case when not in use. A hinged cover protects panel during transportation or storage.

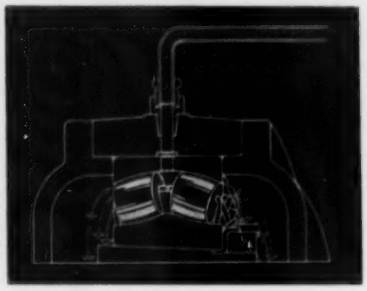
Metering consists of a 4½-in. voltmeter scaled 0-70 KV, connected directly across output and accurate within 3 per cent of full scale. A 4½-in. ammeter scaled 0-2.5 ma., accurate to 2 per cent and automatically protected against overload, is also provided. For light weight and compactness a voltage quadrupler circuit is used with a dry type transformer with selenium rectifiers, capacitors and meter-multiplier resistors immersed in oil for corona-free operation. Input is 115 V.A.C., 50/60 cycle. Other features include an "On-Off" circuit breaker, suitable pilot lights, continuously variable output voltage, non-locking push-button switch to energize high voltages, and a "Zero-Return" interlock. *Associated Research, Inc., 3758 W. Belmont Avenue, Chicago 18.*

Refrigerator Car Insulation

Rigorous and extended tests of Fiberglas Aerocor insulation installed in two refrigerator cars have been concluded with the insulating material found in excellent condition. Opening of the cars revealed the Aerocor to be in perfect condition, according to the manufacturer of the insulation. The Aerocor was resilient, fluffy and bone dry.

URTX car 37998, built by the General American Transportation Corporation, July, 1950 was opened in Chicago, and FGEX car 39540, constructed by the Fruit Growers Express Company, in October 1949, was opened in Alexandria, Va. Both are ice bunker refrigerator cars and the Aerocor was installed in sidewalls, ceilings and ends. The Aerocor had not settled.

Fiberglas insulations are being used increasingly for thermal and acoustical purposes in railroad rolling stock and for infestation control in box cars, according to Owens-Corning. In the Bishop System of infestation control, Fiberglas wool is installed in ends and sidewalls of cars to prevent admittance of grain, flour and other food products which provide sustenance for insects. *Owens-Corning Fiberglas Corporation, Toledo 1.*



Roller Bearing Lubrication

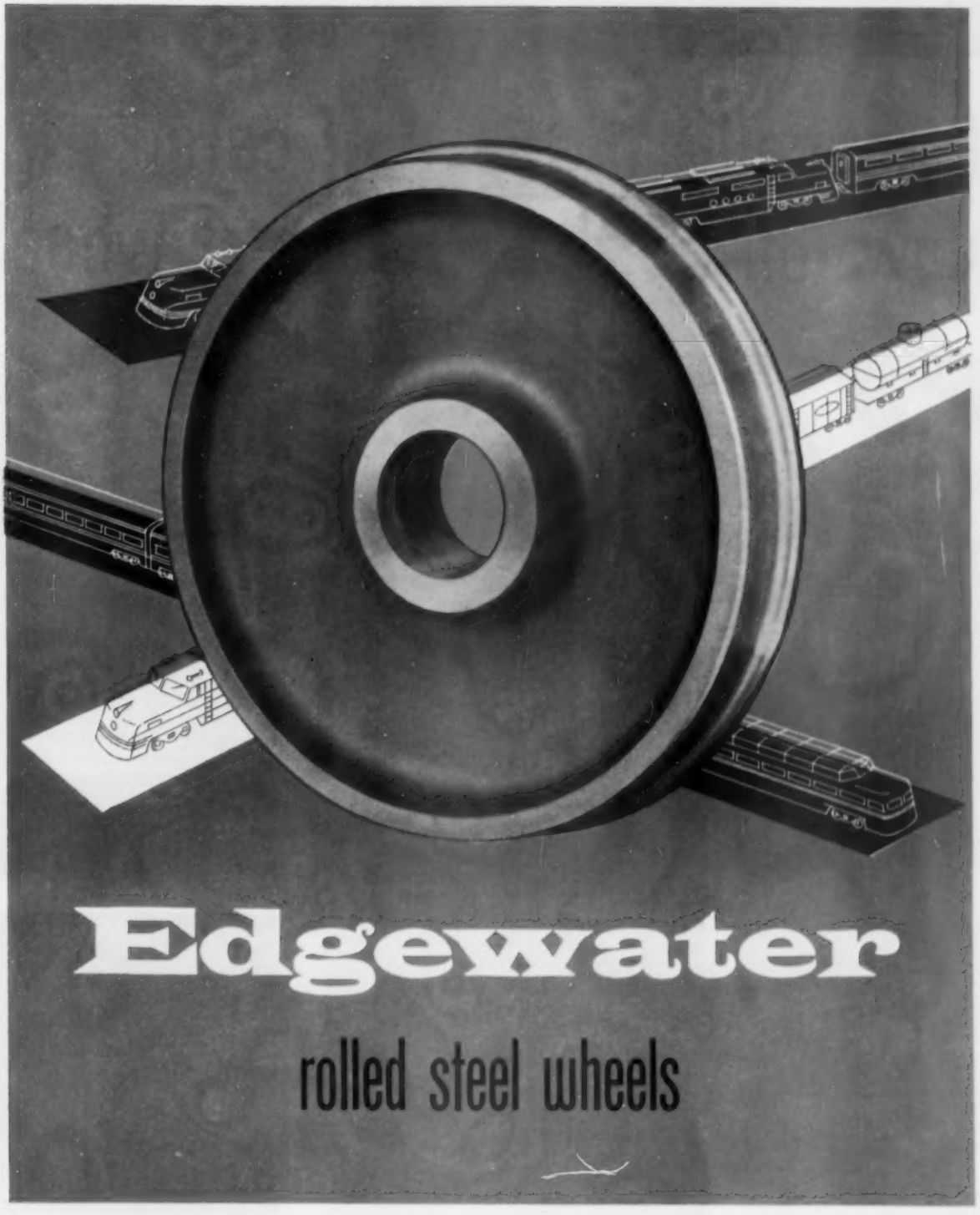
SKF Industries has announced that all spherical roller bearings 9.4488-in. O.D. and larger, including their railroad bearings, will be equipped with lubricating holes in the outer ring at no additional cost to the customer. In the past this has been available on a custom-job basis only. This design change permits more efficient "center" rather than "side" lubrication of a bearing.

A large percentage of anti-friction bearings fail from causes other than pure fatigue. Predominant among these causes, according to SKF, are inadequate lubrication and retention of foreign matter on the rolling surface of the bearing. The effect of having a flow of lubricant from the middle of the bearing toward the outside instead of from the sides toward the center is to flush out old lubricant, and with it, any abrasive dust, dirt, moisture or other impurities. Thus, the fresh lubricant cleans, prevents the entry of dirt into the bearing, and makes it easier for the lubricant to reach all working surfaces. In action, the lubricant flows through the groove in the bearing housing, enters the holes, which are spaced equidistant around the outer ring, flows down into the center of the bearing, between the two rows of rolling elements, lubricating the rollers and rings as the bearing rotates. *SKF Industries, Inc., Philadelphia 32.*

Wire Thread Inserts

Using power tools and hand inserting tools, these stainless-steel wire inserts can be driven directly into wood of all kinds, in-

(Continued on page 10)



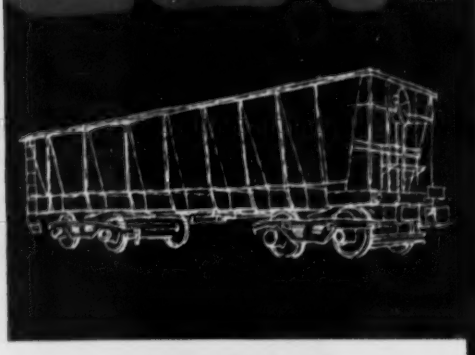
FOR FREIGHT CARS
PASSENGER CARS
DIESEL LOCOMOTIVES

E Edgewater Steel Company PITTSBURGH 30, PA.

MAKING TEST DATA COMPLETE...

Practically all types of cars now roll on the new steel wheel...

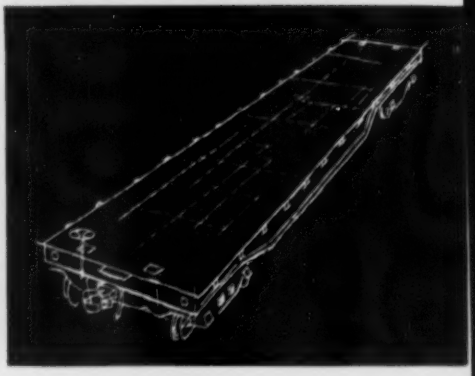
the GRIFFIN



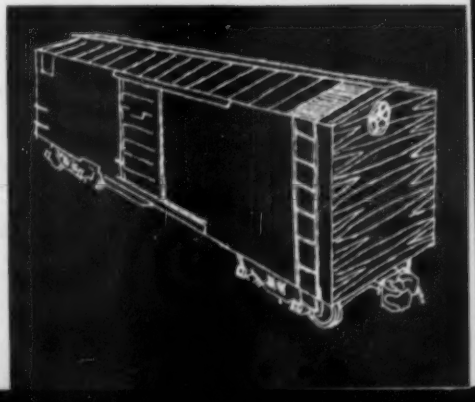
Fifty-five railroads are now using thousands of *new* Griffin EQS steel wheels... *under practically all types of service conditions.*

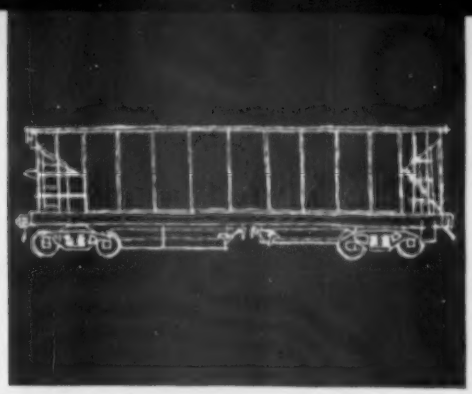
The record of service has been outstanding... it is proving, in the most conclusive possible way, longer life and better wear... *another way of saying lower costs per car mile.*

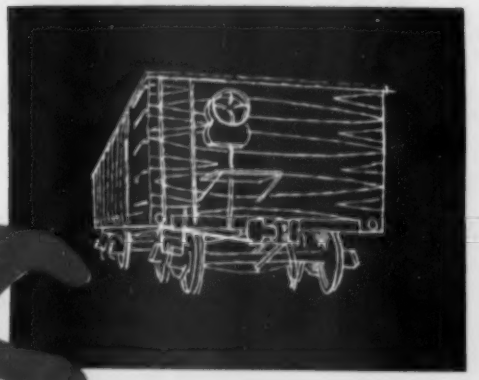
The Griffin EQS wheel comes in fewer tape sizes... accurate in all other dimensions to .020" tolerance ...almost perfectly balanced...and with strong, uniform flanges and rims.



Give the "green" to **GRIFFIN** *and watch your costs go down!*

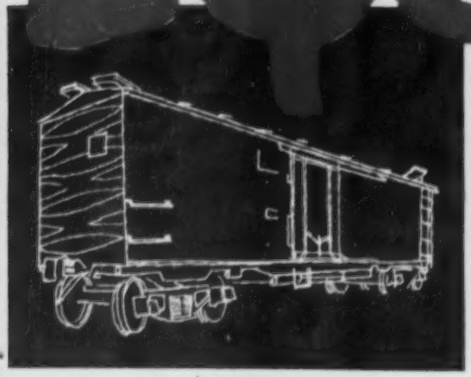


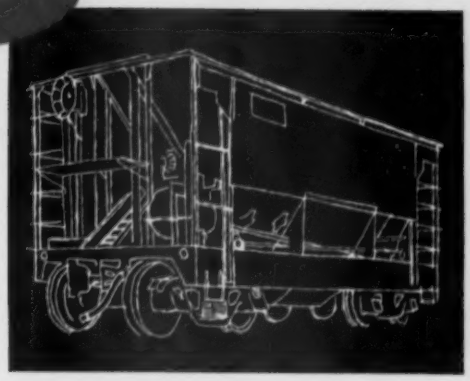


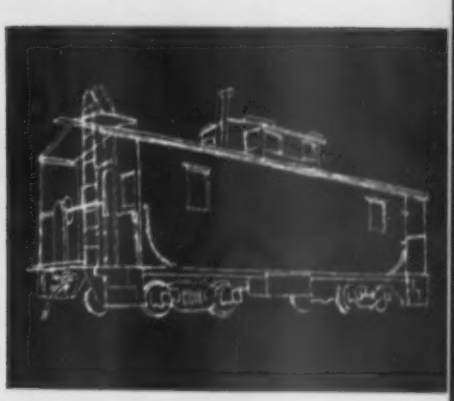


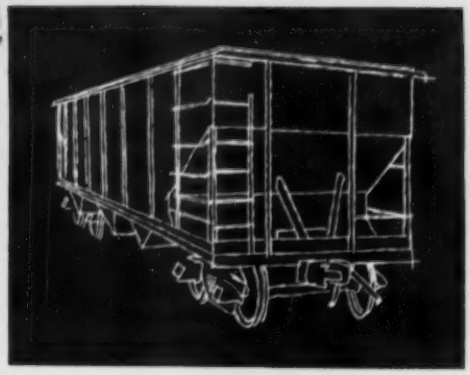
EQS

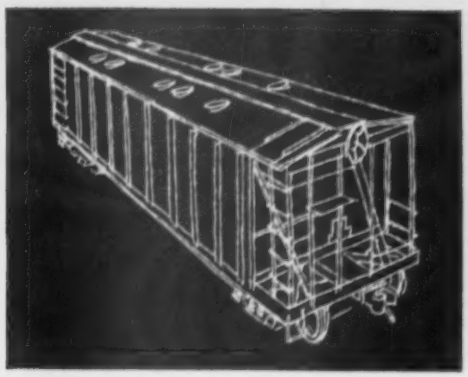
ELECTRIC QUALITY STEEL

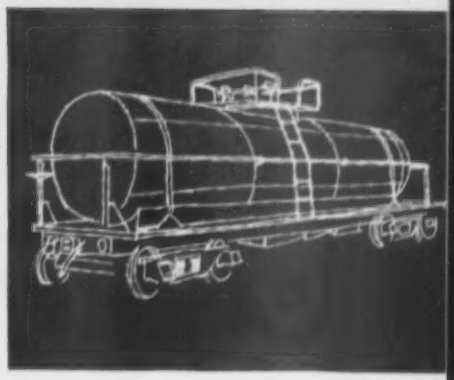


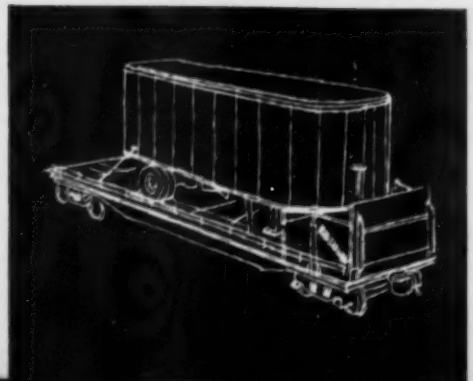












GRIFFIN WHEEL COMPANY

445 N. Sacramento - Chicago 12

Twelve modern plants - strategically located for service

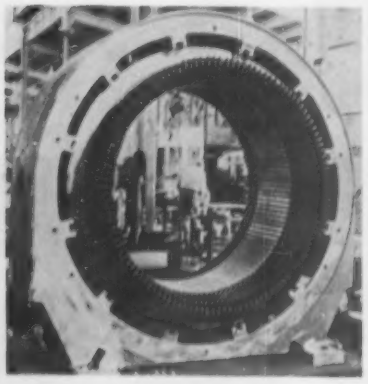
In Canada: GRIFFIN STEEL FOUNDRIES, LTD.
St. Hyacinthe, Quebec

EQUIPMENT... *New Ideas—New Uses*

(Continued from page 6)

cluding plywood, without first tapping threads for fastening parts to wood. The development is said to open up the large-scale use of the product in the manufacture of pallets, heavy-duty crates and boxes and other wooden materials.

Two steps are required. A hole of the correct diameter and depth is drilled, then the insert is driven, using a simple power inserting tool. A mandrel permits turning or winding the insert and, at the same time, applying pressure. The bolt is installed and can be drawn up with the application of greater torque than in an unprotected hole. *Heli-Coil Corporation, Danbury, Conn.*



Coil Insulation

A new insulation of durable laminate glass cloth and mica-filled plastic, based on Bakelite epoxy resin, is expected to increase service life of rewound coils for large motors and generators. Longer life for rewound coils is due almost entirely to the unique properties of Bakelite epoxy resin. It provides a dense seal of dielectric material with none of the voids of conventional coil insulation. This seal keeps out dirt, carbon black, metal dust. The resin is virtually impervious to moisture, acids, alkalies, oils, and most solvents, and an excellent adhesive.

When formed under high temerature and pressure, the plastic and glass-cloth laminate is claimed to be permanently bonded to the copper conductor. Field tests of Epoxylite compounds on railway traction armatures have demonstrated service lives three times longer than normal and are expected to provide even greater mileage. *Larsen-Hogue Electric Co., Los Angeles.*

Rectifiers

A rectifier alloy retaining all the advantages of the copper-oxide rectifier but making possible smaller and more compact rectifier units, offers greater efficiency with better regulation. This Rectaloy rectifier has the same current rating as former copper-oxide rectifiers, but has a higher voltage rating per cell. This requires fewer cells in series and lowers the forward resistance resulting in better voltage regulation. Under laboratory tests this rectifier had about two-thirds of the voltage drop of an equivalent rated selenium rectifier, greatly reducing internal losses.

Life expectancy of the new rectifier is the same as copper-oxide which has proved itself by more than 30 years of service. Like copper-oxide, the new rectifier is impervious to moisture and other adverse environment and maintains stable characteristics even after long periods of idleness *Union Switch & Signal Division, Westinghouse Air Brake Company, Pittsburgh 18.*

Weld Cleaning Brush

A stainless steel wire scratch brush for cleaning stainless steel welds will, according to the manufacturer, eliminate the possibility of oxidation of the stainless parent metal caused by using standard steel scratch brushes. *Air Reduction Sales Company, Division of Air Reduction Company, 60 East 42 street, New York 17.*

Lever-Type Grease Guns

These guns develop 2,500 lb pressure and are designed for servicing bearings requiring large quantities of lubricant. They are equipped with rigid hydraulic coupler extension for contacting hydraulic fittings, or with 12 in. whip hose extension with button head coupler for contacting head grease fittings.

The guns will deliver 0.17 oz per stroke, or 6 strokes per ounce using No. 1 cup grease at 70 deg F. The guns may be spring or force primed. They hold 21 oz of lubricant and include filler nipple for refilling from a filler pump or by suction. They are of all-steel construction, rust-proofed and finished in metallic gun-metal blue. *Lincoln Engineering Company, 5702-14 Natural Bridge avenue, St. Louis 20.*

Oil Resistant Gloves

Gloves for workers handling oil products have a special coating based on Bakelite vinyl resins for resisting oils, gasoline, acids and other chemicals. The durable and flexible coating is fused to a strong, fabric liner for snag and tear resistance. The gloves stay flexible after a 24-hr bath in such solvents as gasoline, kerosene, naptha, mineral spirits and petroleum oils, according to the manufacturer. Six work glove styles include full or palm coating made with Bakelite vinyl resins, mittens, knit-wrist, band-top, and gauntlet style gloves with long or short safety cuffs. *Plasticote Glove Company, 102 East Walnut street, Milwaukee 12.*

Pipe Cutting Oil Reservoir

The Ridgoilr is portable and consists of a removable 15 in. wide chip pan in an oil reservoir with carrying bail, from which a screened hose connects with a hand-operated oil pump-gun. The unit is intended for use when flooding dies with cutting oil while threading pipe with cutting dies.

Placed under the work, it catches oil, chips and cut-offs, while allowing a stream of clean oil on dies, cooling and protecting them. More than 95 per cent of the oil is said to be recovered and used over again *The Rodge Tool Company, Elyria, Ohio.*

Pneumatic Thermostat

Dependability and ease of adjustment are said to be among the most important advantages of Pneumatic Round which was designed to provide a service-free thermostat. This bimetal actuated dial unit eliminates replacements usually experienced with glass tube thermometers on most thermostats. Having no liquid fill, it is unaffected by high or low temperatures extending beyond the scale range.

Perimeter venting permits a free flow of air across the temperature sensing element. Allen head screws securely lock the steel cover to the cast metal base to prevent tampering. Maintenance men can easily calibrate and check the unit for proper function. Only tools required are a small screwdriver and a plug-in air pressure

(Continued on page 99)

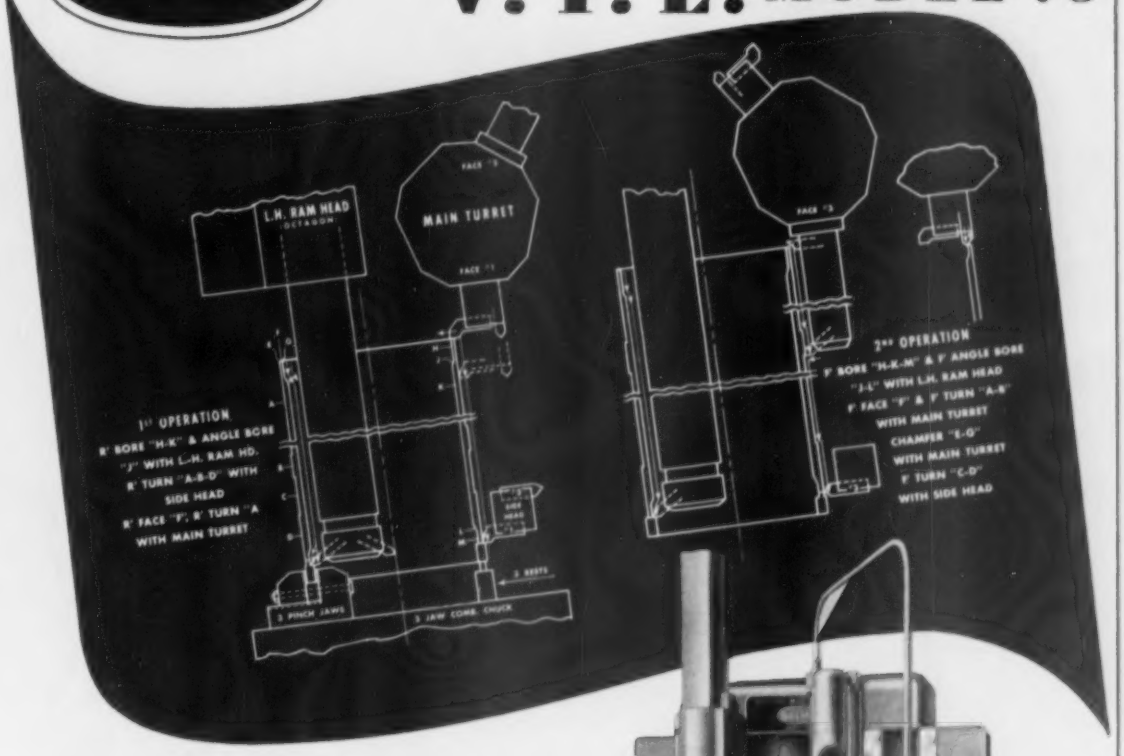
Here is a Time and Cost Saving Method of Machining

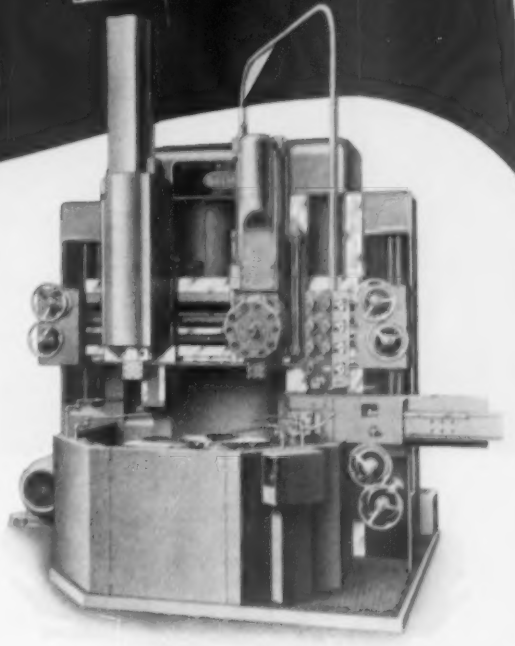
DIESEL CYLINDER LINERS

with a

BULLARD

CUT MASTER V. T. L. MODEL 75


L.H. RAM HEAD
OCTAGON
MAIN TURRET
FACE "S"
FACE "T"
1st OPERATION
8" BORE "H-K" & ANGLE BORE "J" WITH L.H. RAM HD.
8" TURN "A-B-D" WITH SIDE HEAD
8" FACE "F", 8" TURN "A" WITH MAIN TURRET
2 POINT JAWS
3 JAW COMB. CHUCK
2nd OPERATION
9" BORE "H-K-M" & 9" ANGLE BORE "J-L" WITH L.H. RAM HEAD
9" FACE "F" & 9" TURN "A-B" WITH MAIN TURRET
CHAMFER "E-G" WITH MAIN TURRET
9" TURN "C-D" WITH SIDE HEAD



Are you getting comparable production in your shop? If not — you should and you can. Just call your nearest Bullard Sales Representative for full details or write to

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

the BOSTON and MAINE

50-TON 40' 9" PS-1 *standardized box cars*	574
70-TON PS-3 *standardized open top hopper cars*	300
50-TON 53' 0" PS-4 *standardized flat cars*	100
70-TON 2893 CU. FT. PS-2 *standardized covered hopper cars*	26
BOSTON and MAINE standardized car order	**1000**

buys standardization

with a 1000 car order the "Minute Man Route" is first to buy full line standardization

Constantly enhancing its reputation for "Minute Man Service," the pace-setting Boston and Maine relies heavily on Pullman-Standard Standardized Freight Cars for its enviable service-to-shippers record. And the Boston and Maine, with a 1000 freight car order, has become the first railroad to single-order all four types in the Pullman-Standard line of standardized freight cars. This railroad, like 74 others, learned the benefits of standardization through the PS-1 Box Car. "The Minute Man Route" ordered 1950 PS-1s on three previous orders, and found that these cars lived up to the claims made by the nation's leading carbuilder, Pullman-Standard.

Now the Boston and Maine is broadening its use of standardization by purchasing quantities of PS-2 Covered Hopper Cars, PS-3 Open Top Hopper Cars, and PS-4 all-purpose Flat Cars, in addition to more PS-1 Box Cars. With rolling stock of this kind, the Boston and Maine will be able to provide even higher standards of service for its important shippers and consignees.

Pullman-Standard introduced standardized freight cars ten years ago. Since that time railroad-shipper-consignee acceptance of the concepts of standardization has been evidenced by the fact that nearly one out of every four box cars built today is a P-S standardized car.

Standardization means cars that are designed, engineered, produced, tested and in-service inspected. Planned for integrated strength through tested mutually supporting components, standardized freight cars are mass produced and precision crafted by facilities impossible for limited production cars. And the performance of standardized freight cars is confirmed by critical in service inspections.

Learn how the four P-S Standardized Freight Cars are sufficiently flexible in design to be adapted to your needs while providing important price and performance economies. Your inquiry will bring a prompt response.

BUILT TO SERVE BEST ON THE
GREAT AMERICAN RAILWAY
System
BY PULLMAN-STANDARD

WORLD'S LARGEST MANUFACTURER OF PASSENGER AND FREIGHT CARS

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

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BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

NEWS

1955 Equipment Orders and Installations

LOCOMOTIVES

AAR reports new units put into service last year by Class I roads totaled 1,182 (1,172 diesel-electrics, 10 electrics), compared with 1,113 (1,097 diesel-electrics, 15 gas turbine-electrics, one steam turbine-electric), in 1954. December 1955 installations, all diesel-electric, totaled 157—largest number installed in any month since March 1954. On January 1, 854 new units were on order by Class I roads, including 827 diesel-electrics, 15 gas turbine-electrics, 12 electrics, compared with 492 units on order January 1, 1955, which included 483 diesel-electrics, 10 electrics.

FREIGHT CARS

Last year's freight-car orders totaled 169,872, compared with 23,324 in 1954, the ARCI and AAR report. 1955 total was highest since 1922, when 178,210 cars were ordered. Cars delivered last year aggregated 36,896, compared with 35,558 in 1954. December 1955 orders were for 42,278 cars, compared with monthly record high of 51,066 in November, and 2,685 in December 1954. The January 1 backlog of orders was 147,320, compared with 15,317 on January 1, 1955.

New Lineup Takes 6,156 Cars Out of Class I Fleet

The reclassification of railroads which the Interstate Commerce Commission made effective January 1 reduced the freight car fleet of Class I roads by 6,156 cars.

This was reported by Chairman A. H. Gass of the Car Service Division, AAR, in a recent review of the "National Transportation Situation." Mr. Gass explained, however, that the 6,156 cars are not lost to the transportation industry, but merely will no longer be included in AAR statistics.

Reclassification raised the minimum annual operating revenues for Class I roads from $1,000,000 to $3,000,000. Mr. Gass said this resulted in eight roads with a total ownership of 7,144 cars being eliminated from the Class I group, and four roads with a total ownership of 988 cars being brought in.

Allowance for the Class I group's net loss of 6,156 cars should be made in comparison with ownership for any prior date, Mr. Gass advised. Proceeding on that basis, he had this to say about the situation as one of the first of this year:

"Freight car ownership on January 1 was 1,774,614. Although this is 6,409 less than reported on December 1, 1955, it included the 6,156 decrease due to reclassification, which means there was an actual loss in ownership of only 253 cars."

The serviceable fleet as of January 1 was reported on the new basis as 1,700,243 cars—2,151 less than the total for December 1, 1955. But, here again, allowance for

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE FEBRUARY ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road and builder	*No. of units*	*Horsepower*	*Service*	*Other detail*
LOUISVILLE & NASHVILLE:				
Alco Products	28	1,600	Freight	Complete order for 56 units scheduled for delivery by April 1.
Electro-Motive	24	1,750	Freight	
	4	1,200	Switching	
NEW YORK, NEW HAVEN & HARTFORD:				
Electro-Motive	90	1,750	Passenger	Includes 60 "diesel-electric-electric" units to be equipped for operation from straight electric current by third rail.
Alco Products	15	1,800	.....	.....
Fairbanks, Morse	15	1,600	.....	.....
NORFOLK & WESTERN:				
Electro-Motive	33	1,750	General purpose	Deliveries to start this month.
Alco Products	17	1,800	General purpose	Deliveries to start this month.

FREIGHT-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Cap., tons*	*Length, ft.*	*Other detail*
ATCHISON, TOPEKA & SANTA FE:					
General American	700	Hopper	70	..	Delivery of both lots expected second quarter 1957.
ACF Industries	100	Box	50	..	
CHICAGO & EASTERN ILLINOIS:					
ACF Industries	200	Hopper	70	..	Delivery first quarter 1957.
CHICAGO & NORTH WESTERN:					
International Ry. Car	25	Cabooses	..	..	Delivery third quarter 1956.
CHICAGO GREAT WESTERN:					
General American	25	Cov. hopper	70	..	"Airslide" cars. Estimated cost, $304,500. December delivery.
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC:					
ACF Industries	1,000	Box	50	..	Deliveries first quarter 1957.
Pacific Car & Foundry	50	Refrigerator	70	..	Spring delivery.
	50	Insulated box	50	..	Spring delivery.
CHICAGO, ROCK ISLAND & PACIFIC:					
ACF Industries	50	Box	50	..	Approximate cost, $395,000.
DETROIT & MACKINAC:					
General American	75	Box	50	..	Delivery fourth quarter this year.
	25	Hopper	70	..	Delivery first quarter 1957.
ELGIN, JOLIET & EASTERN:					
Greenville Steel Car	200	Gondola	70	65½	Estimated cost, $2,000,000. Delivery fourth quarter this year.
PACIFIC FRUIT EXPRESS CO.:					
Company shops	1,800	Std. refrig.	..	..	.....
	200	Mech. refrig.	..	..	Super-insulated. Deliveries both lots expected to start in December.
PACIFIC GREAT EASTERN:					
National Steel Car	150	Flat	70	..	Deliveries of all cars in order expected third quarter this year.
	50	Gondola	70	..	
	10	Refrig.	50	..	
PENNSYLVANIA:					
Company shops	1,200	Box	..	..	.....
	1,300	Gondola	..	..	.....
	400	Flat	..	..	.....
	2,800	Hopper	..	..	.....
	300	Cov. hopper	..	..	.....
ST. LOUIS SOUTHWESTERN:					
Bethlehem Steel	200	Gondola	70	..	Estimated cost, $1,550,000. Delivery second quarter 1957.
SOUTHERN:					
Thrall Car	15	Flat	90	..	With depressed centers. Estimated cost, $300,000. Deliveries expected to begin in June.
TORONTO, HAMILTON & BUFFALO:					
National Steel Car	50	Gondola	70	52½	Mill type, fixed end cars Sept-Oct. deliveries.
UNION:					
Greenville Steel Car	50	Gondola	70	65	Approx. cost, $10,200 each. Delivery third quarter 1956.
	500	Hopper-car bodies	50	..	Approx. unit cost, $6,000. Deliveries to begin in December.
UNION TANK CAR CO.:					
Company shops	1,260	Tank	..	..	Various capacities. 220 aluminum. Deliveries late 1956 and early 1957.
WESTERN MARYLAND:					
Bethlehem Steel	500	Hopper	70	..	Estimated cost of 650 cars, $5,605,000. Delivery fourth quarter this year.
Greenville Steel Car	150	Cov. hopper	70	..	
WESTERN PACIFIC:					
Thrall Car	25	Flat	50	..	Estimated cost, $215,000. Delivery fourth quarter this year.

PASSENGER-CAR ORDERS

Road and builder	*No. of cars*	*Type of car*	*Other details*
BOSTON & MAINE:			
Budd	24	Rail diesel	.....
CHICAGO & NORTH WESTERN:			
Pullman-Standard	16	Suburban	Double-deck; 161-passengers. Estimated cost, $2,320,000. Deliveries to start in August.

NOTES AND INQUIRIES

LOCOMOTIVES:
Colorado & Southern will acquire 11 new diesel-electric road switchers.

FREIGHT CARS:
Colorado & Southern will acquire 300 new box cars.

the 6,156-car shift shows an actual increase of about 4,000 in number of available cars.

Butler Introduces Atomic Locomotive Bill

Senator Butler, Republican of Maryland, has carried out his previously announced plans and introduced in the Senate a bill to authorize an appropriation for the construction of an atomic-powered locomotive.

The bill is S.2893. It contemplates that the atomic locomotive would tour the country hauling an exhibit train illustrating peaceful uses for atomic energy.

The senator, last October when announcing his intention to introduce the bill, pointed out that the Atomic Energy Commission had already entered into an agreement with the Baldwin-Lima-Hamilton Corporation and the Denver & Rio Grande Western to conduct studies on the engineering, technical and economic aspects of an atomic locomotive and to make recommendations on the role industry might play in its development.

He went on to explain that his bill would authorize AEC, with the advice and assistance of the Interstate Commerce Commission, to develop and construct "an atomic energy propulsion facility for adaptation to a railroad locomotive of such characteristics and design as will make it usable in American railroad transportation." The Secretary of Commerce would arrange for operation of the locomotive "in such manner as circumstances and the public interest warrant."

Senator Butler had been assured by Edward J. Kehoe, a member of the AAR committee on atomic energy and formerly associated with AEC, that an atomic locomotive is "entirely feasible." The senator also said: "My proposal envisions a sort of 'Freedom Train' drawn by an atom-powered engine containing atomic exhibits which would tour the United States and give our people a firsthand view of the progress made in the 'atoms for peace' program . . . almost certainly such an exhibit train . . . would do as much as any single act to spark our expansion in a new atomic age. It would likewise speed the revolution in domestic transportation."

Longhurst Heads ICC's Section of Rail Safety

Howard R. Longhurst has been appointed assistant director of the Interstate Commerce Commission's Bureau of Safety and Service and chief of the bureau's Section of Railroad Safety. Mr. Longhurst had been acting assistant director and acting chief of the section since the retirement last fall of Francis C. MacDonald who served briefly as successor to Shirley N. Mills.

George B. Anderson has been appointed assistant chief of the section. Mr. Anderson had been chief of the section's Signaling and Train Control Branch.

Inspector's Job May Become Easier

The mechanical inspector's job may be made a little easier as a by-product of a study to simplify the billing for repairs made by one railroad to cars of another. What may make the job easier is a revised form of billing repair card for train yard repairs which eliminates writing out the name of the item applied and the reason for it. Instead, these items are printed on the card and merely have to be checked off. Following a 7-day trial of such a preprinted form of repair card at a medium size yard on the Rock Island, the mechanical supervisor wrote:

"I find the new repair cards helpful and also find an increase of repairs by some of our men in the yard. By actual time study, the new type repair card can be written (two items of repairs) in 15 seconds less time, average, than the old style repair card.

". . . This type of repair card would be helpful in bad or wet weather when it is difficult to write legibly and I believe it would assist in getting cards promptly made at the car and more easily read by the billing clerks." The accounting department liked the new cards too, finding that they were easier to sort, more legible, reduced correspondence and generally expedited the procedure.

The possibilities of adopting a card of this type was among several subjects explored by a committee of the Railway Systems and Procedures Association in an attempt to simplify the present arrangement the railroads use to bill each other for car repairs, which essentially is this: If 652 brake shoes are applied to cars of the ABC railroad by the XYZ road, the bill lists brake shoes and its unit price 652 times (in addition to other items such as 183 brake shoe keys, 58 journal box lids, etc.). Furthermore, a card for the repairs made is attached to the bill. This all-out effort to double check every last item of ex-

(Continued on page 18)

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of November 1955	Month of November 1954	11 months ended with November 1955	11 months ended with November 1954
3	Road locomotive miles (000) (M-211):				
3-05	Total, steam	5,683	5,464	60,549	67,981
3-06	Total, Diesel-electric	36,810	33,285	391,445	357,120
3-07	Total, electric	752	653	8,266	7,136
3-04	Total, locomotive-miles	43,471	39,622	462,686	433,909
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,698	1,533	18,455	16,623
4-06	Empty, total	964	900	10,094	9,692
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	12,799	11,817	139,600	137,672
6-02	Total in oil-burning steam locomotive trains	2,496	1,843	24,432	24,812
6-03	Total in Diesel-electric locomotive trains	103,390	92,435	1,108,545	988,287
6-04	Total in electric locomotive trains	2,196	1,999	25,061	21,919
6-06	Total in all trains	121,617	108,844	1,305,612	1,178,319
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.02	1.02	1.02	1.02
10-02	Loaded freight car-miles	41.9	41.4	42.9	41.0
10-03	Empty freight car-miles	23.8	24.3	23.4	23.9
10-04	Total freight car-miles (excluding caboose)	65.7	65.7	66.3	64.9
10-05	Gross ton-miles (excluding locomotive and tender)	3,003	2,941	3,030	2,906
10-06	Net ton-miles	1,364	1,311	1,377	1,290
12	Net ton-miles per loaded car-mile (M-211)	32.5	31.7	32.1	31.4
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car-miles	63.8	63.0	64.6	63.2
14	Averages per train hour (M-211):				
14-01	Train miles	18.5	18.7	18.6	18.7
14-02	Gross ton-miles (excluding locomotive and tender)	55,610	54,322	55,809	53,888
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	48.1	44.4	47.0	42.7
14-02	All	46.2	41.6	44.5	40.3
15	Average net ton-miles per freight car-day (M-240)	958	830	924	799
17	Per cent of home cars of total freight cars on the line (M-240)	40.4	50.9	45.1	53.0

PASSENGER SERVICE (DATA FROM I.C.C. M-213)

3	Road motive-power miles (000):				
3-05	Steam	1,141	1,700	15,237	24,544
3-06	Diesel-electric	19,658	20,193	222,170	229,088
3-07	Electric	1,255	1,326	14,273	15,183
3-04	Total	22,053	23,219	251,687	268,816
4	Passenger-train car-miles (000):				
4-08	Total in all locomotive-propelled trains	226,296	232,232	2,574,407	2,697,474
4-09	Total in coal-burning steam locomotive trains	7,089	8,172	87,307	120,273
4-10	Total in oil-burning steam locomotive trains	2,750	6,020	44,580	91,915
4-11	Total in Diesel-electric locomotive trains	201,242	203,213	2,277,967	2,317,145
12	Total car-miles per train-miles	9.82	9.62	9.82	9.66

YARD SERVICE (DATA FROM I.C.C. M-215)

1	Freight yard switching locomotive-hours:				
1-01	Steam, coal-burning	314,486	268,985	3,186,832	3,364,239
1-02	Steam-oil-burning	47,950	52,588	536,210	597,156
1-03	Diesel-electric[1]	3,774,273	3,355,066	29,645,713	36,169,442
1-06	Total	4,141,279	3,683,663	43,437,015	40,225,876
2	Passenger yard switching hours:				
2-01	Steam, coal-burning	7,801	10,377	92,480	129,206
2-02	Steam, oil-burning	5,441	5,599	58,222	57,315
2-03	Diesel-electric[1]	240,800	246,428	2,682,836	2,787,188
2-06	Total	279,925	287,329	3,117,507	3,256,137
3	Hours per yard locomotive-day:				
3-01	Steam	7.1	4.9	5.9	4.8
3-02	Diesel-electric	16.4	15.2	15.7	15.0
3-05	Serviceable	16.1	14.9	15.4	14.4
3-06	All locomotives (serviceable, unserviceable and stored)	14.7	12.8	13.7	12.4
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.70	1.68	1.64	1.68
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.76	.76	.75	.75

[1]Excludes B and trailing A units.

LOW, WIDE AND HANDSOME

The pride of the Central... protected by SINCLAIR!

Exclusive use of Sinclair GASCON® Diesel Lubricating Oil by the New York Central's new Aerotrain is proud proof of Sinclair dependability. Lightweight, low-cost, high-speed and ultra-modern, the Aerotrain on its initial run rounded curves at 10 to 15 miles an hour faster than regular practice – sliced more than an hour from the Central's usual schedule between Chicago and Detroit.

Sinclair is proud of being called upon to lubricate and fuel the newest contender for rail supremacy . . . proud, too, that it has kept pace with the rapid strides of railroad development.

SINCLAIR RAILROAD LUBRICANTS

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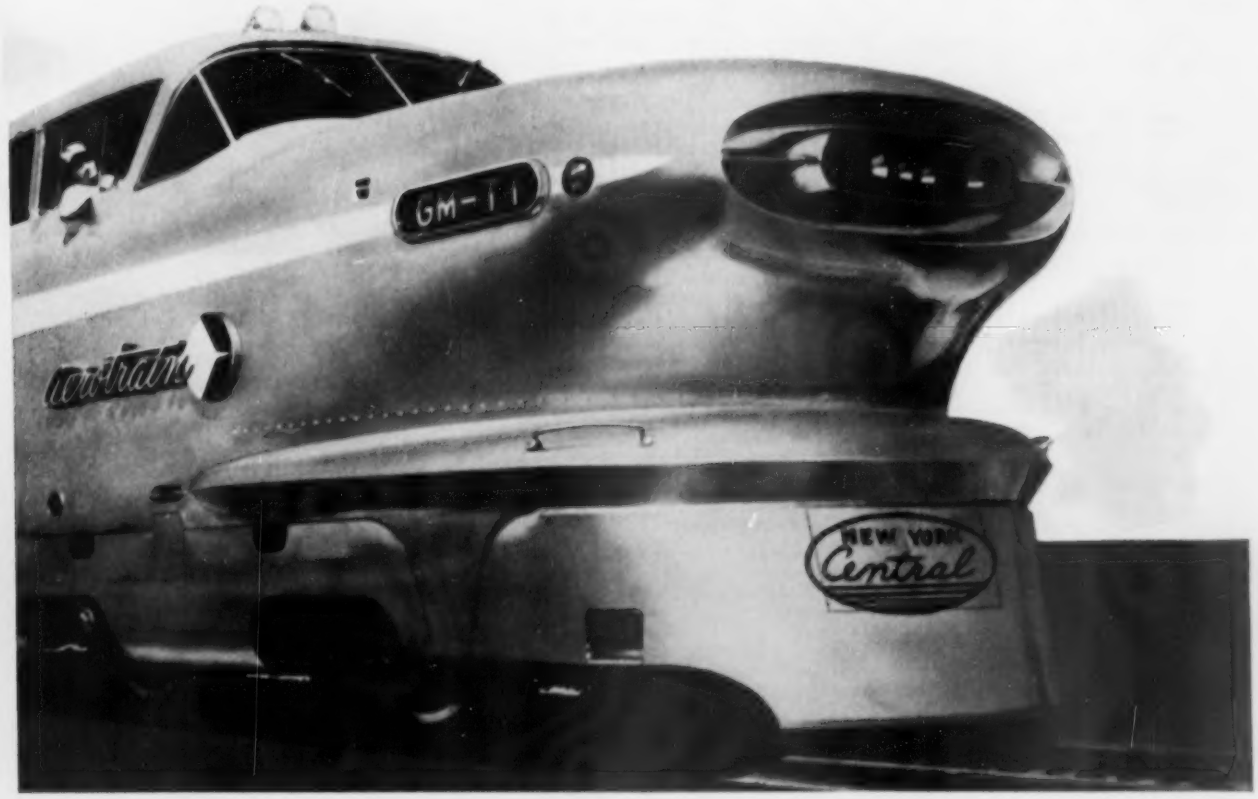


(Continued from page 15)

pense, down to the repetitious minor charges, has been characterized as "spending dollars to chase dimes."

Two years ago a dozen or so roads got together and decided to simplify this procedure for billing minor train yard repairs. They agreed to accept bills from each other that in effect stated 652 brake shoes once instead of one brake shoe 652 times. To allow the receiving road to verify or check the bills, they continued to attach the appropriate repair cars to the typewritten bill which listed the grouped totals. From this study the RSPA committee concluded the interchange rules should be amended to permit (though not require) use of the simplified billing system and that the plan should be extended. Part of the savings are now being dissipated because cards have to be sorted between roads that participate in the plan and those that do not. It was also thought to be worth while to examine three of the rules (101, 107 and 111) to establish a unit price that would include both labor and material on many items on which these charges are now separate.

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
November, 1951	2,939,503	2,022	4,405	6,427	457,368
November, 1952	2,984,102	2,198	4,501	6,699	445,455
1953					
November	2,788,773	1,987	3,404	5,391	517,301
December	2,656,063	1,581	2,550	4,131	642,958
1954					
January	2,583,485	3,082	3,797	6,879	375,561
February	2,445,214	2,953	4,066	7,019	348,370
March	2,658,757	2,196	3,637	5,853	455,813
April	2,570,518	3,079	5,149	8,228	312,411
May	2,713,511	4,416	6,510	10,926	248,353
June	2,662,375	6,597	9,617	16,214	164,202
July	2,678,234	7,956	10,912	18,868	141,946
August	2,696,135	7,568	9,742	17,310	155,756
September	2,614,432	6,740	8,882	15,622	167,355
October	2,852,825	5,182	6,985	12,167	234,472
November	2,717,219	2,515	3,467	5,982	454,232
December	2,751,644	1,501	2,294	3,795	725,070
1955					
January	2,714,070	1,813	2,701	4,514	601,256
February	2,517,483	2,266	3,970	6,236	403,701
March	2,830,398	2,717	5,076	7,793	363,197
April	2,787,705	3,471	6,485	9,956	280,002
May	2,931,850	4,860	8,664	13,524	216,788
June	2,945,955	6,080	10,226	16,306	180,666
July	2,906,558	8,086	13,635	21,721	133,813
August	2,954,439	8,555	14,358	22,913	128,941
September	2,923,592	5,896	10,469	16,365	178,649
October	3,025,177	3,966	7,182	11,148	271,364
November	2,950,228	2,010	3,972	5,982	493,184

PERSONAL MENTION . . . . . .

Atchison, Topeka & Santa Fe

JOHN W. LUKE, master mechanic at Argentine, Kan., appointed superintendent of shops at San Bernardino, Cal.

P. B. ROGERS, superintendent of shops at Wichita, Kan., retired.

J. C. GARREN appointed superintendent of shops at Wichita, Kan.

Atlanta & West Point-Western of Alabama-Georgia

E. J. HALEY appointed general superintendent, with jurisdiction over transportation and mechanical departments. Headquarters, Atlanta, Ga.

A. T. MILLER, general superintendent at Atlanta, Ga., retired.

Canadian National

R. M. VEENIS, mechanical engineer, Central region, at Toronto, appointed superintendent motive power and car equipment, Northern Ontario district. Headquarters, North Bay, Ont.

J. A. PATTERSON appointed road foreman of engines, Atlantic region, Headquarters, Moncton, N. B.

J. M. GALLUP appointed road foreman of engines, Campbellton division, Headquarters, Campbellton, N. B.

D. H. SHAW, road foreman of engines, appointed master mechanic, New Glasgow division, with headquarters at New Glasgow, N. B.

R. L. STEEVES appointed road foreman of engines, Moncton division. Headquarters, Moncton, N. B.

Chicago, Burlington & Quincy

A. J. HAVLIK, mechanical inspector, appointed engineer—locomotives and cars. Headquarters, Chicago.

Delaware & Hudson

Pennsylvania and Susquehanna Divisions have been consolidated. Now known as the Pennsylvania-Susquehanna Division. Equipment Department under jurisdiction of A. C. ALLEN, master mechanic, at Oneonta, N. Y. Position of master mechanic at Carbondale, Pa., abolished.

THOMAS J. BRADLEY, assistant to general diesel supervisor, appointed assistant general diesel supervisor. Headquarters, Colonie, N. Y. Former position abolished.

THOMAS M. MURPHY appointed assistant master mechanic, with jurisdiction over locomotive section at Carbondale, Pa., Green Ridge, and Wilkes-Barre. Headquarters, Carbondale, Pa.

THOMAS H. SMAILES appointed general car foreman, with jurisdiction over car section at Carbondale, Pa., Green Ridge, Hudson and Wilkes-Barre, Pa. Headquarters, Hudson, Pa.

Delaware, Lackawanna & Western

JOHN E. MAHONEY, assistant to vice-president—operations at Hoboken, N.J., appointed assistant to president—research and development.

Scranton, Pa.

GEORGE F. BACHMAN, superintendent of diesel locomotive maintenance, appointed assistant general superintendent motive power and equipment. *Born:* January 14, 1916, at Cedar Rapids, Iowa. *Education:* University of Illinois 1939 (BS Railway Mechanical Engineering). *Career:* Became special apprentice on Chicago, Rock Island & Pacific in 1939. From 1941 with the Lackawanna successively as enginehouse foreman, diesel supervisor, master-mechanic, and superintendent of diesel locomotive maintenance.

G. F. Bachman

CHARLES C. COULT, fuel supervisor, appointed mechanical engineer. *Education:* University of Michigan 1917 (BS in Mechanical Engineering). *Born:* November 29, 1894, at Waverly, Pa. *Career:* Began in 1920. Successively with the Barrett Company; Craftsman Tool Company; I.C.S., until 1924 when he became draftsman on Lackawanna. Appointed fuel supervisor in 1934.

T. J. MCDERMOTT, mechanical engineer, retired.

WALTER E. TRAVIS appointed superintendent of diesel locomotive maintenance.

THE

M-F

UNI-TORQUE

LOCK NUT

has something

more

than the standard holding features of ordinary lock nuts.

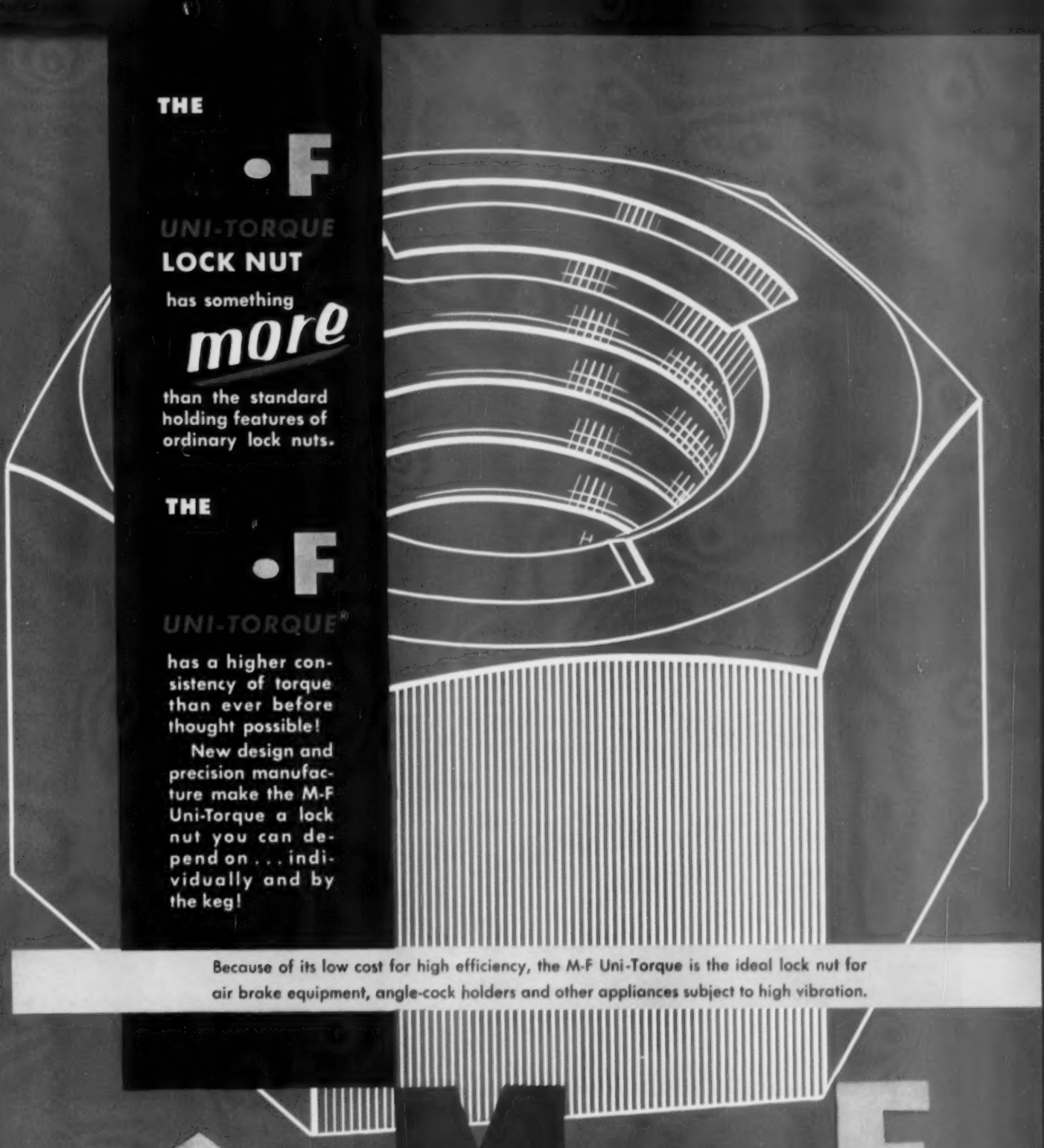
THE

M-F

UNI-TORQUE®

has a higher consistency of torque than ever before thought possible!

New design and precision manufacture make the M-F Uni-Torque a lock nut you can depend on . . . individually and by the keg!



Because of its low cost for high efficiency, the M-F Uni-Torque is the ideal lock nut for air brake equipment, angle-cock holders and other appliances subject to high vibration.

M-F LOCK NUT
No. 1
Used with a standard nut. Spins on.

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Spins on, locks itself and holds.

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ANOTHER GM GENERAL MOTORS CONTRIBUTION TO RAILROAD PROSPERITY

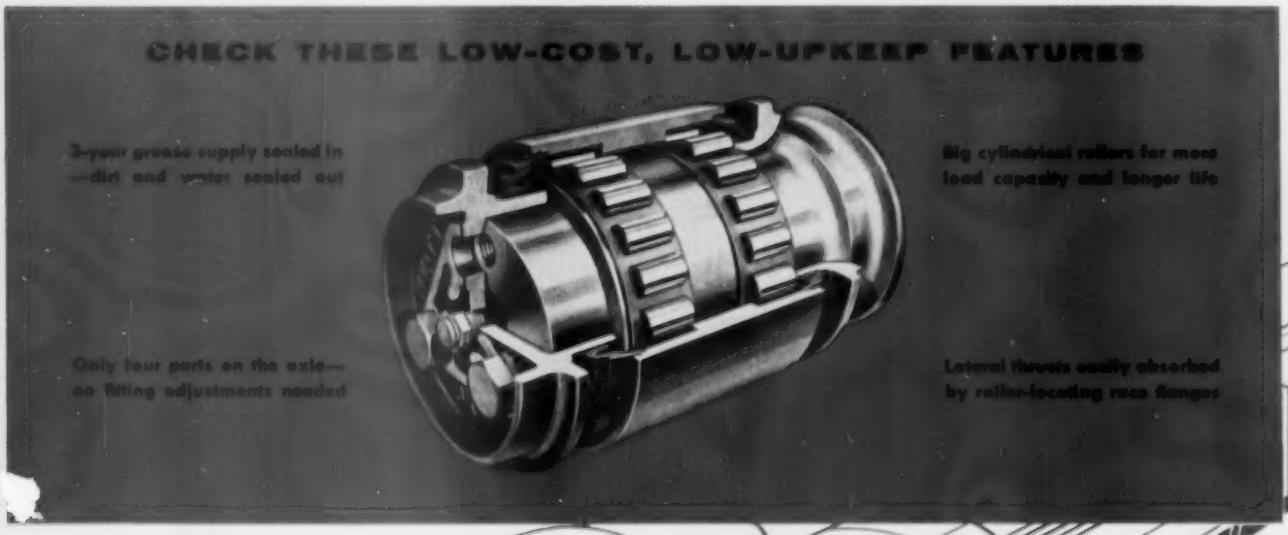
new HYATT

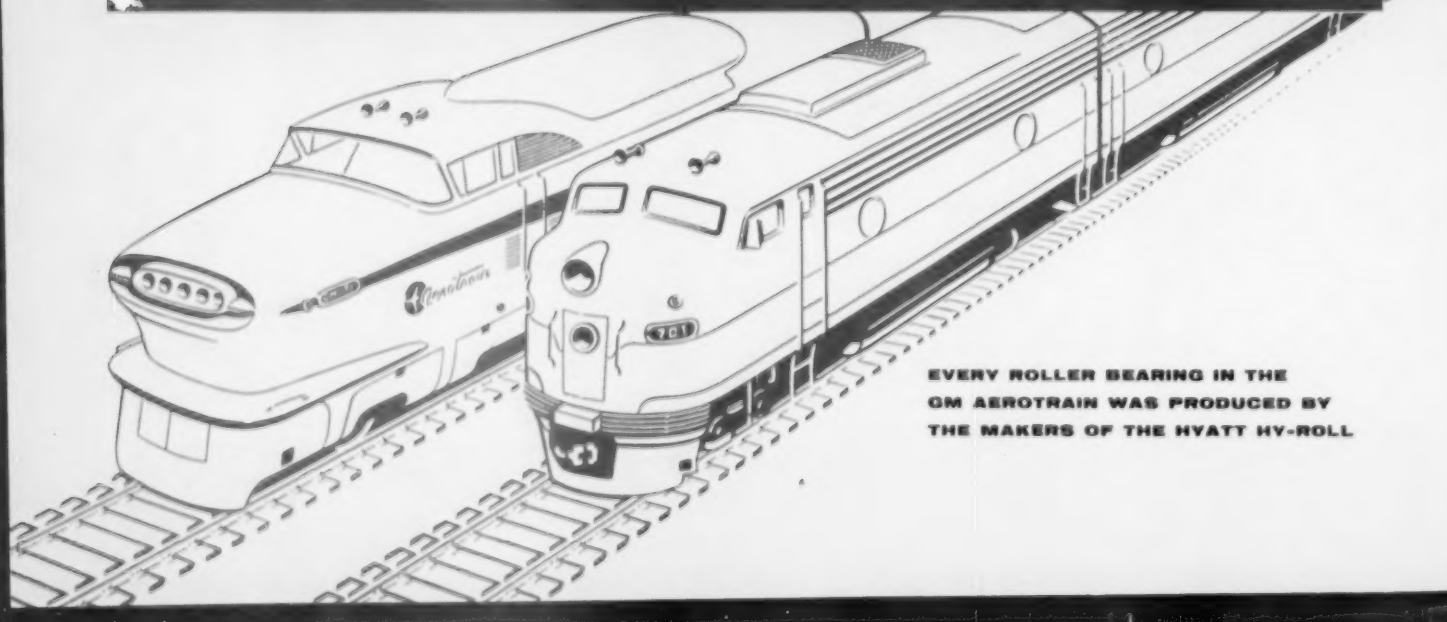
So simplified, so dependable, so economical—it now makes the big switch to roller bearing freight practical!

HYATT has built over 30,000 roller bearing journal boxes for freight cars of 17 major railroads—*plus* more than 125,000 boxes for passenger cars and diesel locomotives. And every one has time-tested *straight cylindrical rollers*, like the HYATTS on the revolutionary new General Motors Aerotrains!

Now from this matchless experience comes the cylindrical-roller HYATT Hy-Roll—the low-cost, low-upkeep roller bearing for freight. The unit that is *practical* for sweeping conversions which will save railroads millions annually in costly inspection, lubrication and hotbox delays!

Now is the time to beat non-rail competition with faster *non-stop* freight service rolling on HYATT Hy-Rolls. Remember, tomorrow's profits depend on foresight today—call your HYATT Sales Engineer or write for further details now! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

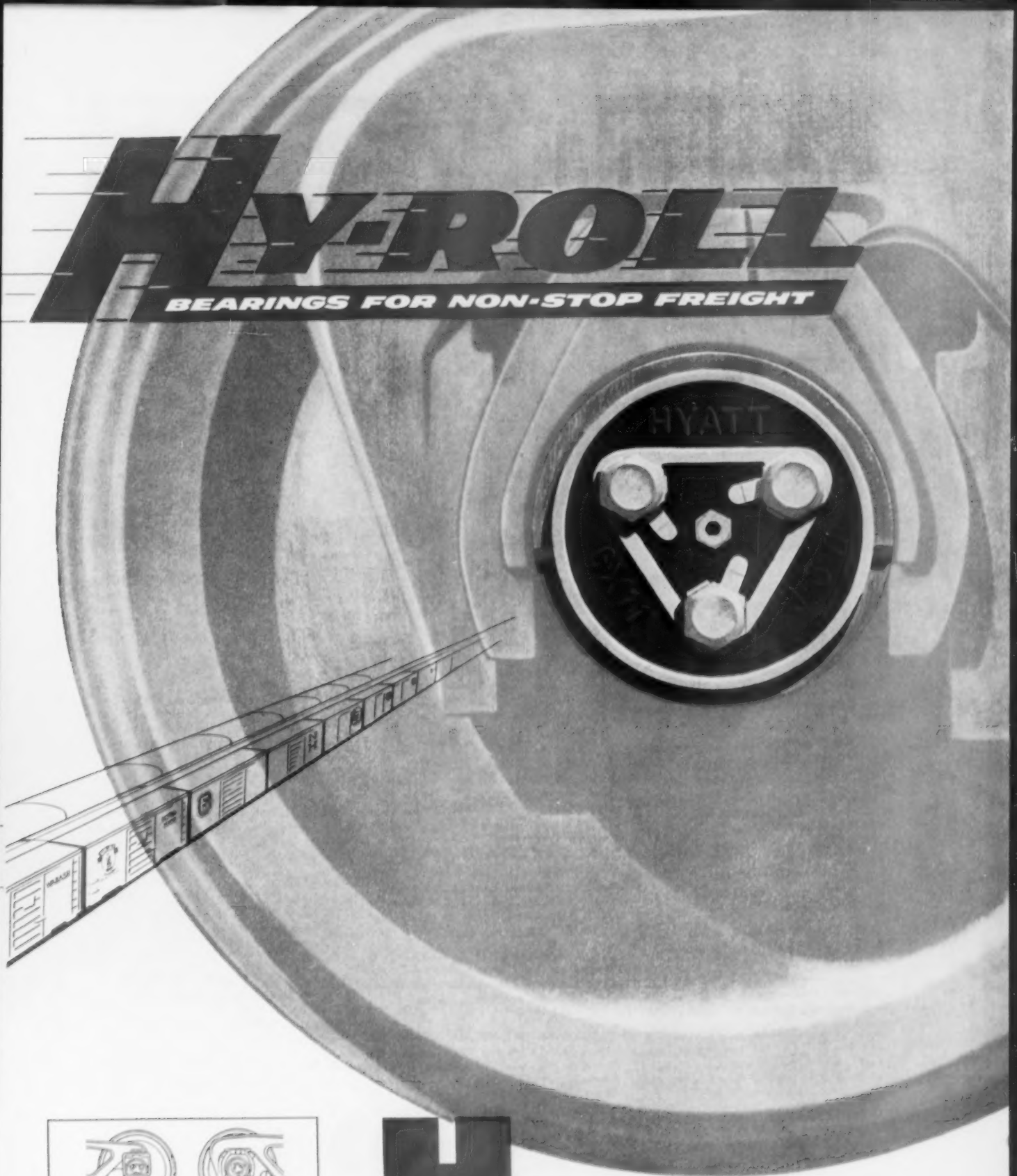

CHECK THESE LOW-COST, LOW-UPKEEP FEATURES
3-year grease supply sealed in —dirt and water sealed out
Big cylindrical rollers for more load capacity and longer life
Only four parts on the axle— no fitting adjustments needed
Lateral thrusts easily absorbed by roller-locating race flanges



EVERY ROLLER BEARING IN THE GM AEROTRAIN WAS PRODUCED BY THE MAKERS OF THE HYATT HY-ROLL

HY-ROLL

BEARINGS FOR NON-STOP FREIGHT



ONE BEARING FITS BOTH!

With the addition of a simple wedge or saddle, the HYATT Hy-Roll fits both pedestal and integral trucks.

HYATT

HY-ROLL BEARINGS FOR NON-STOP FREIGHT

MORE HYATT ROLLER BEARINGS ARE IN USE ON AMERICAN RAILROADS THAN ANY OTHER MAKE

Elgin, Joliet & Eastern

EDWIN ABRAHAM, assistant to superintendent motive power and equipment at Joliet, retired.

I. J. MCCOMB, regional lubricating supervisor, appointed foreman, car shop, Scully, Pa.

Illinois Central

C. P. TRUEAX, assistant electrical engineer at Chicago, retired.

C. R. WADHAM appointed assistant electrical engineer at Chicago.

Norfolk & Western

J. C. JOHNSON, JR., assistant to superintendent car department, office of general superintendent motive power, retired.

Pennsylvania

Northwestern Region

H. E. HELMUTH, regional lubricating inspector, Chicago Division, appointed assistant car foreman, Northwestern Region, Chicago.

W. S. ROYSE, assistant car foreman, Chicago Division, appointed car foreman, Northwestern Region, Crestline, Ohio.

K. L. WORKING, assistant coach yard foreman, Chicago Division, appointed assistant car foreman, Logansport, Ind.

T. F. SCHOEFFEL, gang foreman, appointed assistant car foreman, Chicago.

Northern Region

J. E. RICHEY, assistant foreman, Cleveland car shop, appointed foreman—car shop, Olean, N. Y.

H. W. BOOHER, foreman—Conway car shop, appointed foreman, Oil City (Pa.) car shop.

M. G. MAUSTELLER, mechanical inspector, office of superintendent of locomotive equipment, Philadelphia, appointed assistant foreman, Ebenezer enginehouse, Buffalo.

Philadelphia Region

P. M. BRODT appointed foreman, Park shop, Philadelphia.

J. F. ROSEMAN appointed assistant foreman, Enola (Pa.) steam enginehouse.

Reading

HOWARD HILL, superintendent motive power and rolling stock at Reading, Pa., retired.

WALTER A. W. FISTER, assistant superintendent motive power and rolling stock, appointed superintendent motive power and rolling stock. Headquarters, Reading, Pa.

HARRY R. HANSON, master mechanic, Philadelphia area, appointed assistant superintendent motive power and rolling stock. Headquarters, Reading, Pa.

H. C. ATKINSON, mechanical engineer at Reading, Pa., retired.

F. G. FISHER, assistant mechanical engineer, appointed mechanical engineer. Headquarters, Reading, Pa.

J. R. DAVIS, assistant master mechanic, appointed master mechanic, Philadelphia division.

Seaboard Air Line

J. W. DIXON and W. B. LLEWELLYN appointed mechanical inspectors (system) with headquarters at Jacksonville, Fla.

Obituary

RUFUS H. FLINN, vice-president of the Pennsylvania, died on December 8 at the age of 68. Mr. Flinn began his railroad career as a car builder apprentice and was regional superintendent of motive power, Central Region, of the Pennsylvania before his transfer to the operating department on March 1, 1930.

SUPPLY TRADE NOTES . . . . . .

AIR REDUCTION COMPANY, AIR REDUCTION SALES COMPANY.—A $16 million dollar expansion program for 1956 has been announced by Air Reduction Sales. Three new producing plants, at Chicago and Alton, Ill., and Calvert City, Ky., are scheduled for completion this year. Additional producing facilities will be installed at Butler, Pa., and output will be increased at Riverton, N. J. A portion of the appropriation will be for expansion of gas producing facilities in the Southwest, and for additional distribution facilities throughout the country.

■

GIDDINGS & LEWIS MACHINE TOOL CO.—Giddings & Lewis has been reorganized into a divisional-type company, the four main branches having been divided into separate divisions, with a general manager in charge of each. They are the G & L and Hypro division, Cincinnati Bickford division, Kaukauna Machine & Foundry division, and Davis Boring Tool division.

■

DAYTON RUBBER COMPANY.—New and larger offices and warehousing facilities have been established at 927 Slocum street, Dallas, Tex., for Dayton's industrial V-belt division. *M. B. Roach* is southwestern regional manager.

■

DANA CORPORATION.—*Harry S. Clarke* has been appointed assistant sales manager, Railway Division. Mr. Clarke was previously Northeastern district sales manager.

■

ALCO PRODUCTS, INC.—*Joseph W. S. Davis*, district manager of spring and forge sales, has been appointed manager of field sales for spring and forge products.

■

CANADIAN LOCOMOTIVE COMPANY.—Canadian Locomotive has purchased the locomotive division of *Davenport-Besler Corporation* of Davenport, Iowa. R. H. Morse, Jr., president of the locomotive company, said the transaction does not involve purchase of the Davenport plant. His company has acquired, he said, locomotive designs and parts, inventory, patterns, jigs, tools, and fixtures as well as trade names for the Iowa firm's complete line of Davenport and HK Porter industrial locomotives. Davenport-Besler, he said, is leaving the locomotive field.

Mr. Morse said that in addition to operating a company in the United States, CLC will manufacture industrial locomotives at its Kingston, Ont., works for domestic and export sale. He said it is planned to form a new company to operate in the United States.

■

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.—*J. C. Cannon* has been appointed manager of commercial engineering at Wilmerding, Pa. *John W. Morris* succeeds Mr. Cannon as district engineer at St. Louis.

■

PYRENE—C-O-TWO CORPORATION.—With the merger of the *Pyrene Manufacturing Company* and its wholly owned subsidiary, *C-O-Two Fire Equipment Company*, the new name *Pyrene—C-O-Two Corporation* has been adopted.

■

JOSEPH T. RYERSON & SON, INC.—*William K. Underhill*, assistant plant manager at New York, has been named sales manager for the Connecticut plant, at Wallingford.

■

FANSTEEL METALLURGICAL CORPORATION.—*Ralph W. Rawson* has been appointed chief engineer in charge of the newly established centralized engineering department.

■

GENERAL AMERICAN TRANSPORTATION CORPORATION.—Offices of General American are now in the Field building, Chicago.

■

AMERICAN STEEL FOUNDRIES.—*James Sattie*, vice-president, retired January 31 after more than 44 years of service with the company.

■

ACME STEEL COMPANY.—*W. Sheridan Huss*, vice-president and general sales manager of Acme Steel Products division, Acme Steel, has been appointed president of the division, succeeding *John G. Bucuss*, retired. Mr. Bucuss will continue to serve the company in an advisory capacity.

■

D. J. MURRAY MANUFACTURING COMPANY.—*L. L. Duncan*, director of advertising and sales promotion, has been appointed also sales manager of the unit heater and mill supply division.

SAND THE TRACKS . . .

NOT THE BEARINGS

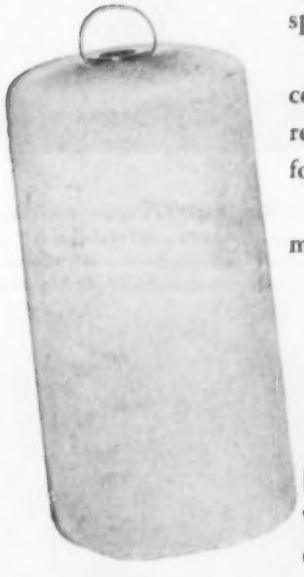
IN A SINGLE RUN FROM NEW YORK TO CHICAGO A DIESEL ENGINE CAN PICK UP ENOUGH GRIT . . .

to ruin it!

The GRIT is there . . . the engine picks it up . . . NOW, IT'S UP TO THE FILTER TO CONTINUOUSLY REMOVE IT! Abrasive substances are the enemy of operating costs and operating schedules. In bad weather they're useful on the *tracks,* but in lubricating or fuel oil—they spell disaster.

WIX Oil Filter Cartridges are the sound answer to the menace of oil contamination. WIX has studied the problem . . . conducted the continuous research to KNOW the answers . . . engineered filter cartridges specifically for railroad diesel service to provide maximum "engine-wear insurance."

Write for the WIX Railroad catalog and particulars on how you, too, may have a specialized study made on your oil filtration problems.



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Please send catalog and particulars on your special oil filtration study.

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2. G-E RECOMMENDED CARBON BRUSHES are selected for the proper degree of hardness and grain structure to minimize wear and tear on commutator surfaces of your unit.

3. G-E GEARING is designed and quality-control manufactured to carry the heavy starting loads and take the running shock loads encountered in today's heavy railroad service.

4. G-E COMMUTATORS retain smoothness in rigorous service because high-speed, high-temperature seasoning process sets segments firmly in place, cuts down friction wear and tear.

7 G-E replacement parts for better locomotive operation

1. G-E RESISTORS are tested and inspected during all phases of manufacture to assure you of top quality. Combination of manufacturing skill and experience makes G-E resistors your best replacement buy.

How G.E. Designs and Builds Resistors to Give You Maximum Service Life

Locomotive resistors are only as good as the care and precision that has gone into their manufacture. That's why General Electric's EWF resistors are your best buy when you need replacements for your locomotives. They're carefully designed and built to meet the demands of today's heavy service.

As an example, G.E. uses sturdy, lightweight, ceramic end supports that give exceptionally good insulation between units and to ground. What's more, they stand up under shock and vibration.

In addition, the edgewise-wound, steel-alloy ribbons on G-E resistors pack more kilowatt capacity into a smaller space, assure ample ventilation; and they, too, will endure severe service shocks.

Most important, G-E resistors have a floating steel backbone that expands and contracts freely with high-temperature changes, thus nullifying the effect of harmful buckling forces.

For all these reasons, you should always specify genuine EWF resistors by General Electric when you need replacements. General Electric Co., Locomotive & Car Equipment Dept., Erie, Pa. 178-16

Progress Is Our Most Important Product

GENERAL ELECTRIC

5. G-E MOTOR SUSPENSION BEARINGS give you longer service life—have a built-in *oil-return* feature which can save up to $85.00 of operating costs per locomotive unit, each year.

6. G-E ARMATURE COILS are available as part of complete rewind kits for your convenience. Every coil is dimensionally accurate and quality insulated for longer life.

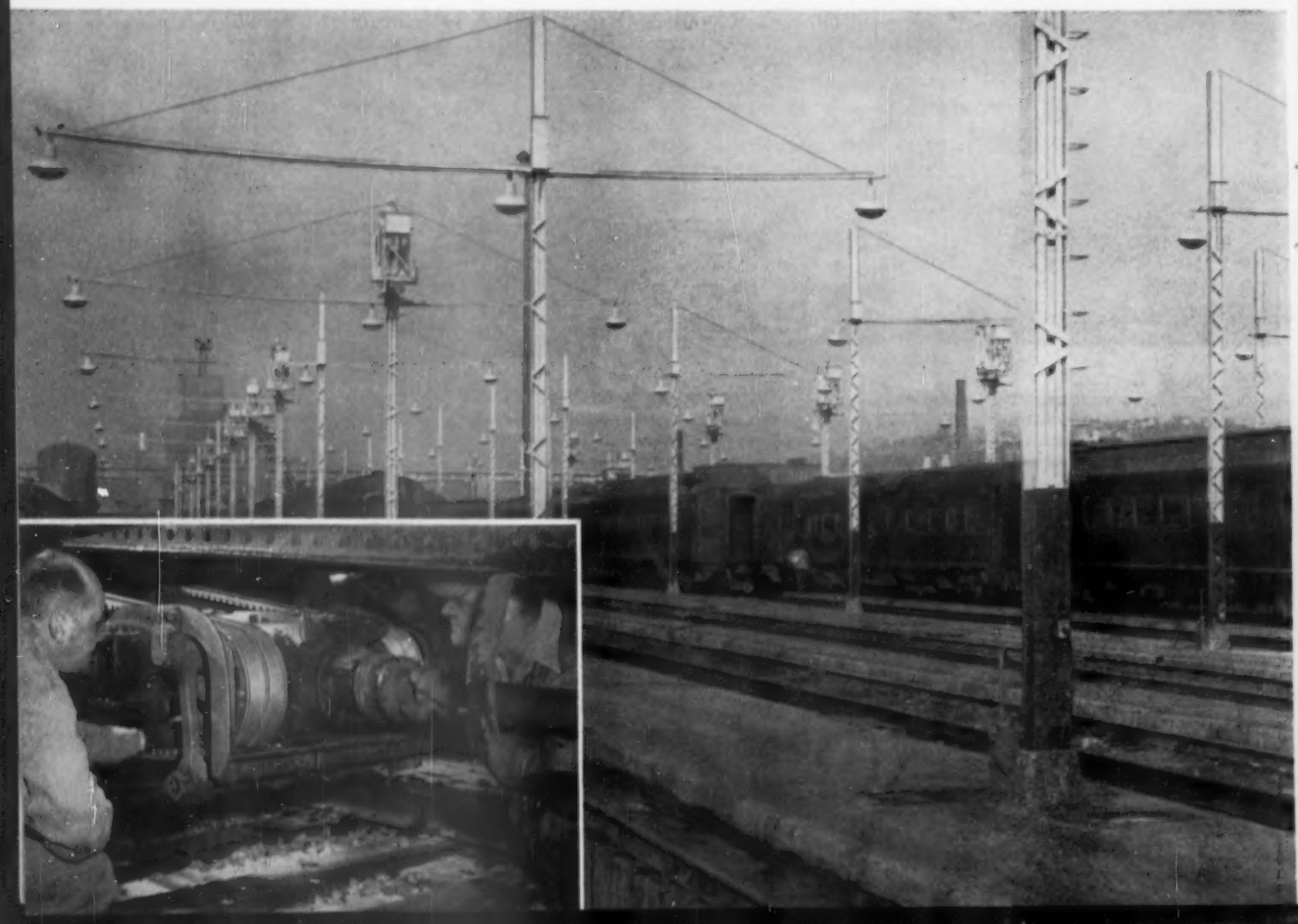
7. G-E CONTACT PARTS break circuits quickly with a minimum metal transfer. This assures you of long service life from these parts.

Your next V-Drive Problem can be solved by "This Man"

"This man" is a Dayton Railway Field Engineer. The Dayton Field Engineer is an expert on V-Belt drive applications in railroading.

He sees your V-Drive problem first hand. With the help of your electrical and mechanical engineers, he works out the best solution for that problem, specifies the proper Dayton equipment and sees that it is delivered and correctly installed. When your V-Drive is working at top efficiency, providing the positive power, dependable service, and economical operation always supplied by Dayton V-Belts—his work is only half finished. Then he begins a periodic check on your Dayton-equipped drives—at various stages of operation—under all weather and road conditions.

Experienced Dayton Field Engineers are always available, across the country, to serve you better through the application of the best in technical knowledge and V-Belt equipment. Write Dayton Rubber Co., Railway Division, Dayton 1, Ohio, for complete information.



When your Dayton Field Engineer specifies Dayton V-Belts, he assures you the best possible V-drive operation. Dayton V-Belts are on more cars than all other makes of V-Belts and are specified as original equipment on 90% of all new Diesel locomotives.

Visit with us at our exhibit AAR Convention, June 27, 28, 29, 1956

Dayton Rubber

51 YEARS OF PROGRESS

World's Largest Manufacturer of V-Belts

Specialized Railway Representatives in New York, Chicago, Cleveland, Atlanta, St. Louis and San Francisco

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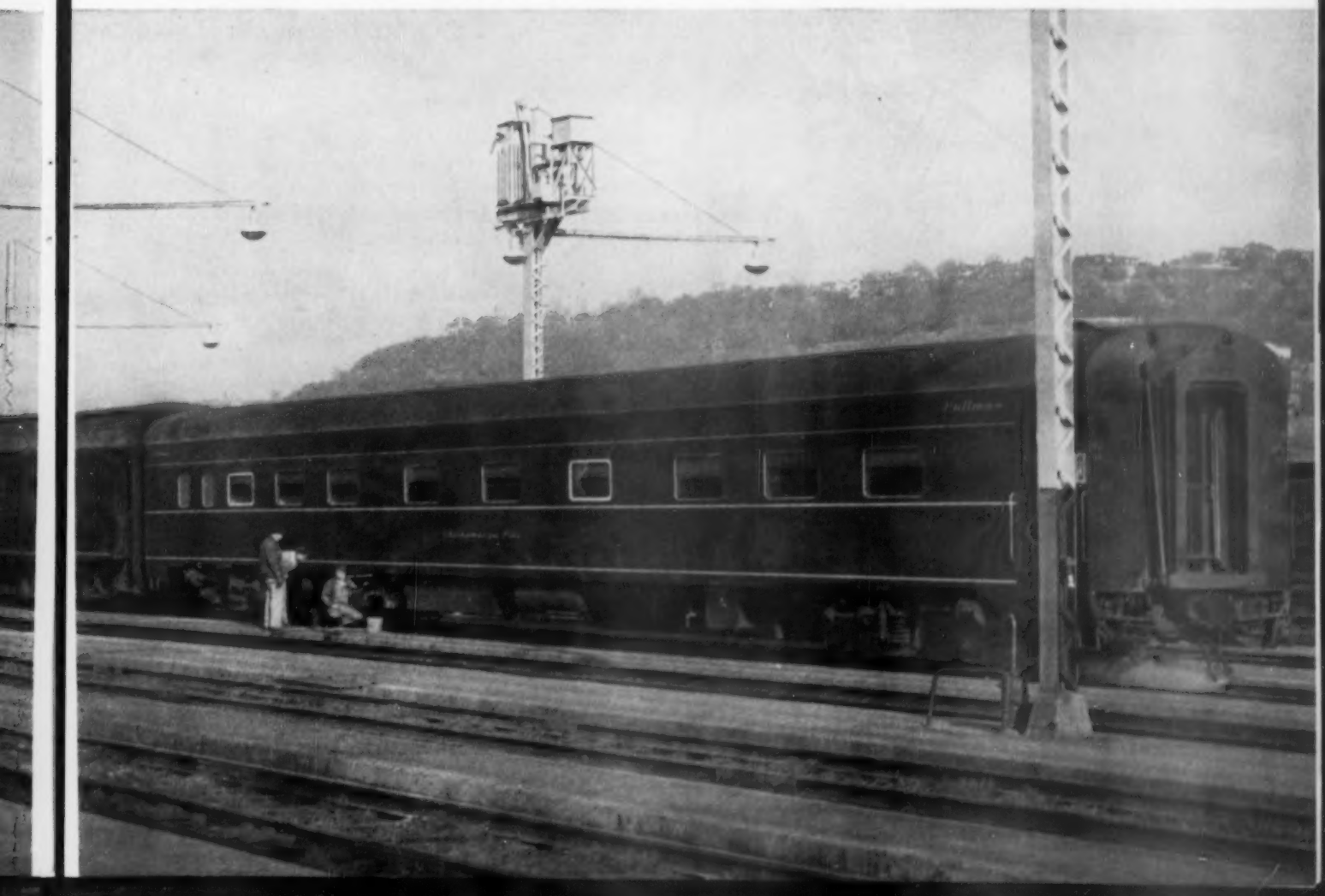
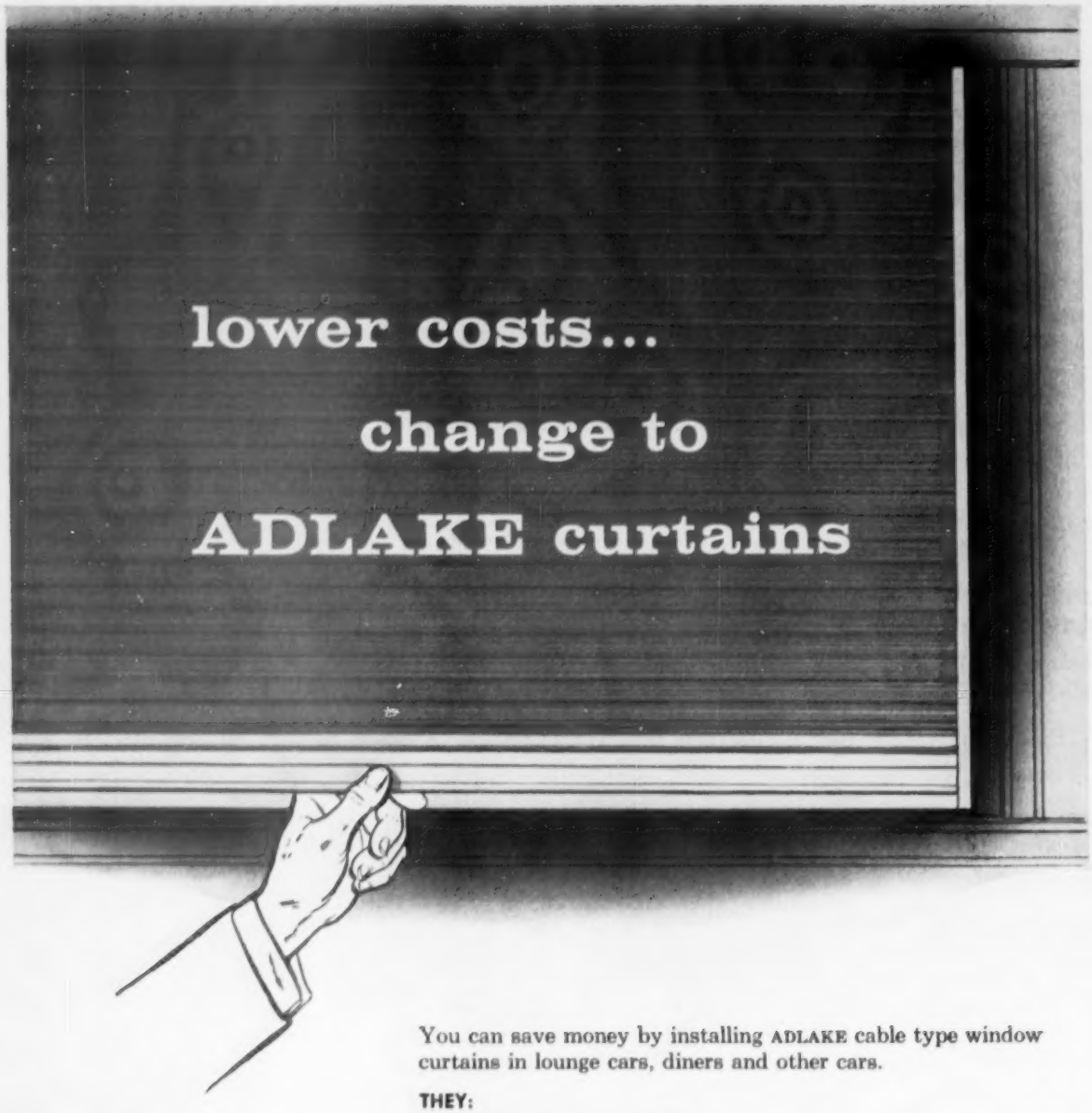




You can save money by installing ADLAKE cable type window curtains in lounge cars, diners and other cars.

THEY:

1. **Cut costs of daily cleaning.**
2. **Cut cost of replacement parts.**
3. **Cut costs of complete installation.**

You will find, as have others, that you can save time, money and annoyance by using ADLAKE cable type curtains in place of other types of blinds.

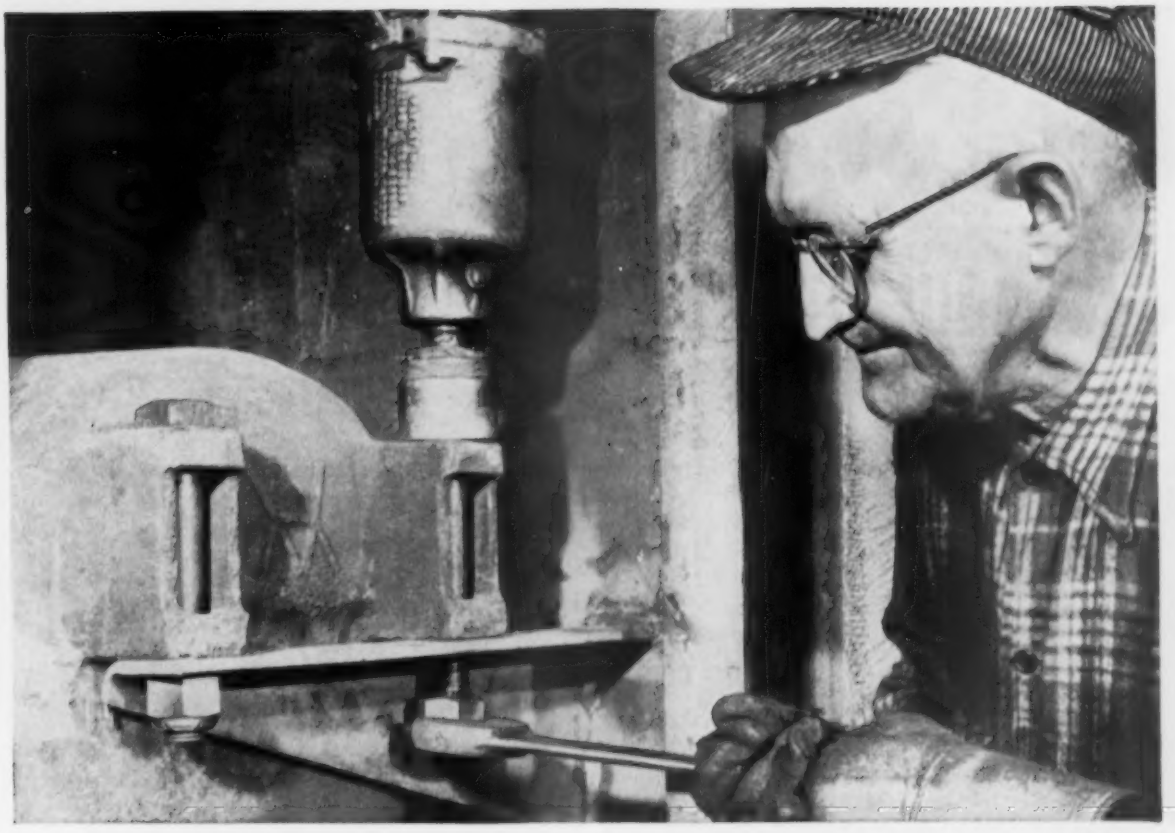
Get the complete facts on ADLAKE curtains and fixtures. Just write The Adams & Westlake Company, 1152 N. Michigan Street, Elkhart, Indiana. No obligation, of course.

Adlake 99th year of serving the transportation, building and control industries

The Adams & Westlake Company

Established 1857 • Elkhart, Indiana • New York • Chicago

Manufacturers of Adlake Specialties and Equipment for the Railway Industry



HOW TO ELIMINATE "BAD ORDER CAR" DOWN-TIME DUE TO FASTENER FAILURE

High speed freight hauling has emphasized the importance of such typical fastener "tough spots" as the AB valve and the brake cylinder and reservoir. This problem of costly fastener failures can become especially critical on specialized equipment such as hopper cars subjected to shaker service, which are continually in bad order due to loose air brake equipment.

The present tremendous effort to replace obsolete rolling stock with modern equipment designed and built to perform efficiently under the increasingly severe conditions imposed by modern traffic operations has focused attention on improved freight car design . . . and fastener requirements are included. As a contributing factor to reducing the number of "bad-order" cars and minimizing inspection and repair costs, leading American railroads are currently specifying the protection of Elastic Stop® nuts for all bolted applications in the vital areas.

For over 27 years American heavy industry has used vibration-proof Elastic Stop nuts on the "tough spots"

where ordinary fasteners perform unsatisfactorily due to severe shock loads, vibration and impact. Positive cost savings result from reduced inspection and fastener maintenance requirements. And only the red elastic locking collar protects internal bolt threads against corrosion!

For detailed information on preventive maintenance savings provided by vibration-proof Elastic Stop nut fastening methods on locomotives, passenger and freight cars, write Railway Sales Division, Dept. N89-323.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 Vauxhall Road, Union, New Jersey

ROLLPIN TRADEMARK

45 G-E Super Gas Turbine-electrics Will Haul Union Pacific Freight Faster

In 1957 Union Pacific will receive the first of 45 new G-E gas turbine-electric locomotives. Delivery of the first unit will mark the culmination of 10 years of intensive research in the gas turbine-electric locomotive field.

Union Pacific President Arthur E. Stoddard has said of the new locomotives, "This power will aid our program for handling our expanding freight traffic load more efficiently. Union Pacific hauls freight faster than any other railroad in the world . . . this new equipment should enable us to do an even better job."

These new locomotives are designed to haul freight pay loads exceeding 5000 tons throughout the West. They will surpass any internally-powered units ever built in their ability to haul trains faster. Powered by 8500 hp they are geared for top freight speed of 65 mph. They are engineered to operate efficiently through a wide and rugged range of weather, temperature and terrain.

Cost of mechanical repairs on these locomotives is expected to be considerably less than on diesel-electric units of the same train handling capacity. Savings are also anticipated in electrical and power plant repairs.

Union Pacific has pioneered with G.E. in the field of gas turbine-electric locomotives. Since 1949 U.P. has installed 25 G-E 4500-hp units which each month see 10,000 miles of service.

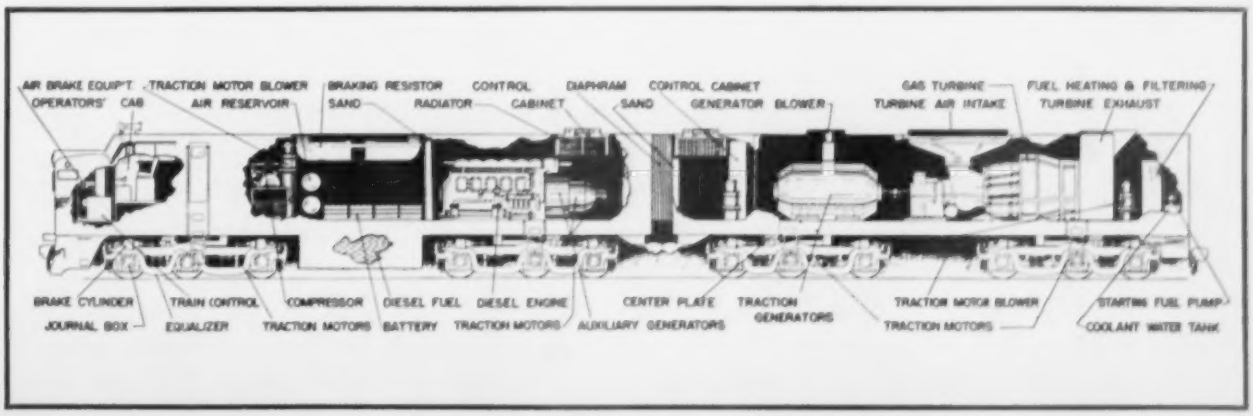
As the nation grows, and as railroads grow, G.E. research and engineering will constantly strive to further railroad progress. Ask your G-E Apparatus Sales representative for more information, or write Section 135-2, Locomotive & Car Equipment Dept., Erie, Pa.

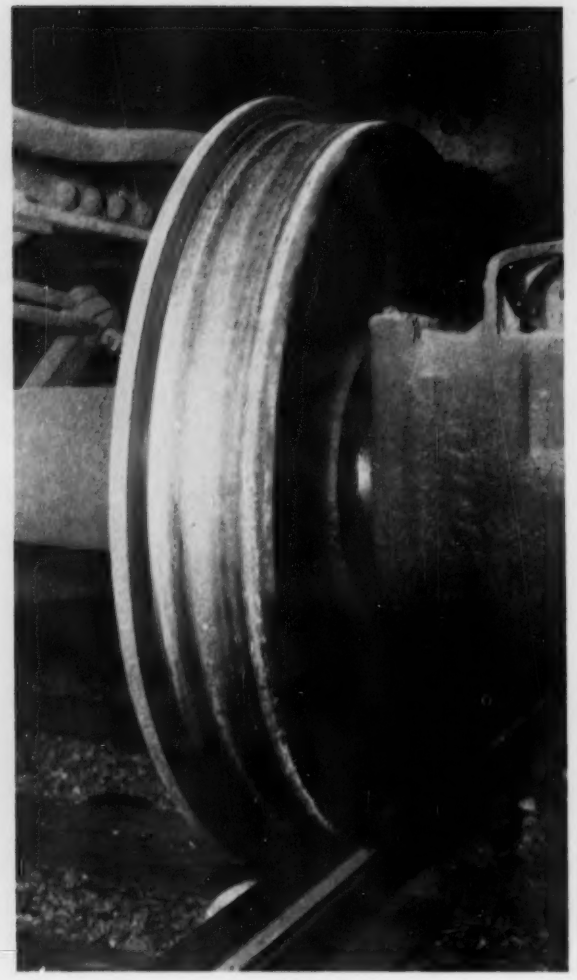
Progress Is Our Most Important Product

GENERAL ELECTRIC

LATEST OF 25 General Electric 4500-hp gas turbine-electric locomotives currently in service on Union Pacific Railroad. In the past 4 years these units have efficiently handled heavy freight service over more than 6 million miles of rugged western terrain.

UNION PACIFIC President Arthur E. Stoddard (left) and General Manager Guy W. Wilson, of General Electric's Locomotive and Car Equipment Dept., inspect a scale model of the new G-E gas turbine-electric locomotive. Operating units (see diagram below) will weigh 408 tons on 12 axles and will be 165 feet long (including the fuel tender) and 16 feet high.





One-Wear Wrought Steel Wheels Still Serve After 28 Years

Forged, rolled and put on the rails in 1928, this pair of one-wear wrought steel wheels is still doing well at its punishing job. From inspection of the tread contours, there's every reason to expect many more years of safe, reliable wear.

Such long-time service is typical of Armco One-Wear Wrought Steel Wheels. They can't be beat for miles of service per dollar. What's more, because they need no maintenance, freight delays are reduced. Shippers stay happy; profits grow faster.

Specially-made wheel steel, forged and rolled for top strength and wear-resistance, goes into every Armco Wrought Steel Wheel. Each is the product of 48 years of wheelmaking experience, adapted to improved modern methods. For you, this is assurance of dependable, safe, time-proven service.

It will pay you to find out more about Armco Wrought Steel Wheels. Just call the nearest Armco District Office, or write us at the address below.

ARMCO STEEL CORPORATION

966 CURTIS STREET, MIDDLETOWN, OHIO

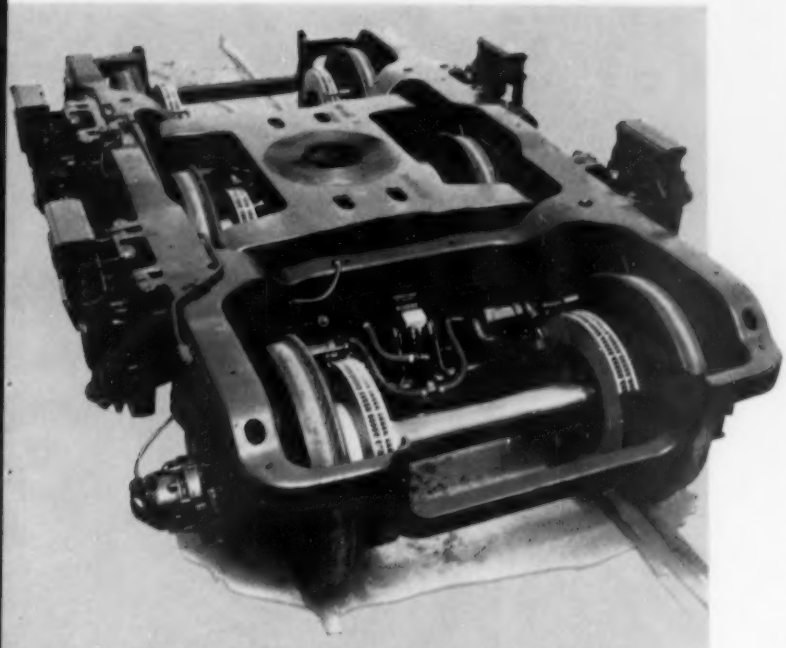
ARMCO®

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Built by
The Budd Company

New Dome Cars for the Great Northern

With Commonwealth Outside Swing Hanger Trucks Provide Outstanding Passenger Comfort and Safety



Top view of 6-wheel outside swing hanger type truck with large central bearing.

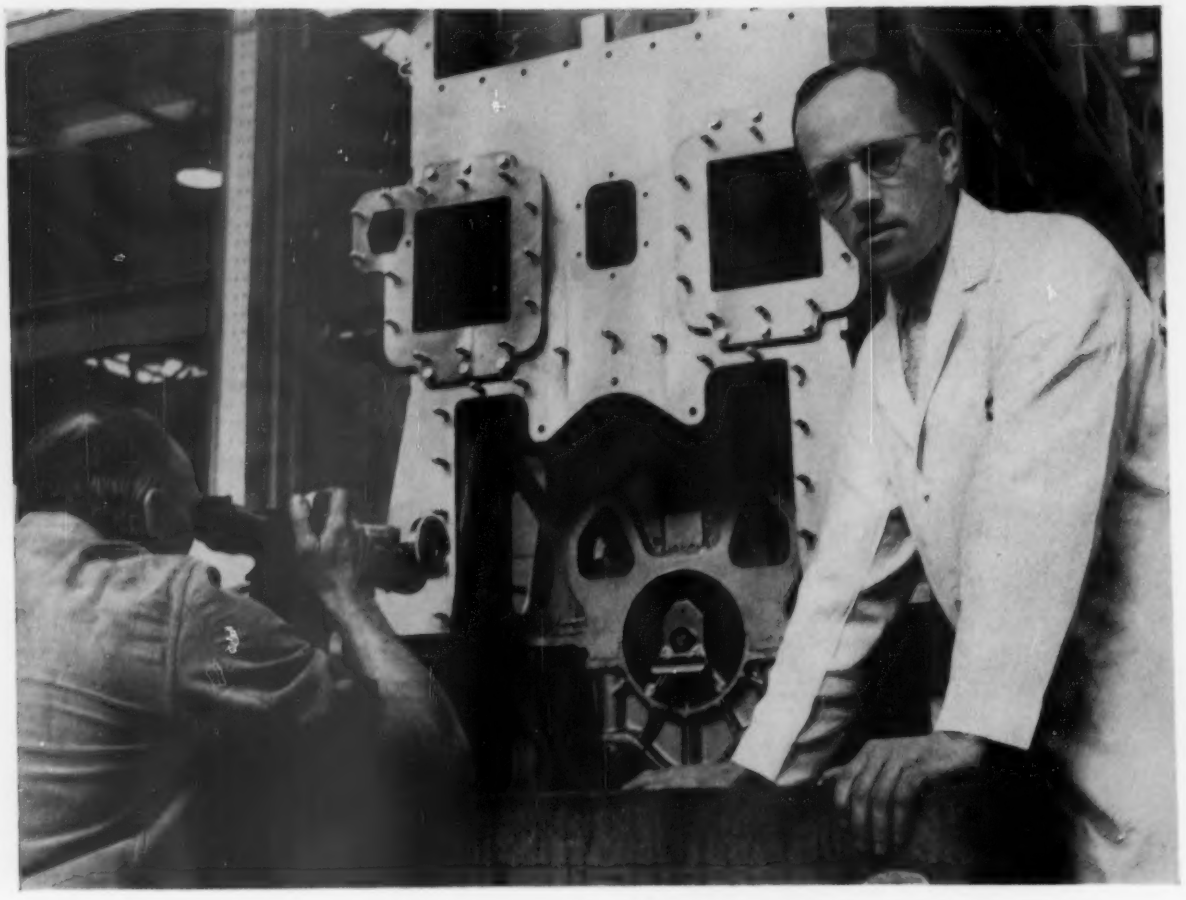
The Commonwealth 6-wheel trucks under these new full length dome cars, with outside swing hangers and spring suspension, assure exceptional riding comfort and safety with lowest upkeep cost.

These modern trucks of latest design greatly simplify inspection and maintenance because of greater accessibility of parts. Central bearings eliminate truck shimmy and increase mileage between wheel turnings.

For the utmost in passenger travel comfort, plus substantially lower maintenance expense, equip *your* cars with Commonwealth Trucks with outside spring suspension, central bearings, and cast steel truck frames and bolsters.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. EDDYSTONE, PA.



The importance of a gnat's eyebrow at Fairbanks-Morse . . . *By our Mr. Drager*

Any variation over $\frac{1}{1000}$ of an inch—a gnat's eyebrow to the average man—throws this inspector into a veritable lather. He is using one of the newest and most modern methods of checking alignment of the main journal bearing saddles that are an integral part of the Fairbanks-Morse Opposed-Piston block.

Precision inspection

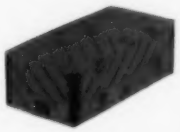
On this test, the engine block sits on a 20-ton granite plate—one of the largest in the world—that is remarkable due to the true flatness of its surface.

The instrument this inspector is using is a precision optical device called (this won't surprise you) a telescopic alignment gauge.

Quality workmanship

But at Fairbanks-Morse, quality improvement does not stop with facilities, technicians and inspectors. Our employees know that quality can't be inspected into a product—it must be built in from the start.

With this precision inspection and quality workmanship, Fairbanks-Morse carries on a tradition of manufacturing integrity—part by part. Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Illinois

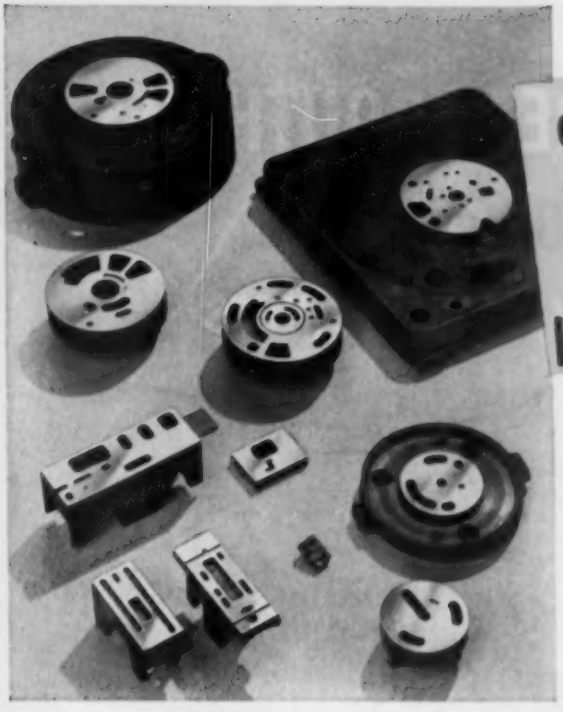


Be sure you get the Dividend of Quality—specify genuine Fairbanks-Morse replacement parts. They are identified by the orange carton—and the Fairbanks-Morse Seal of Quality.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS AND RAILROAD EQUIPMENT • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • MAGNETOS



Get Precision Flatness, Finish and Parallelity on Valve Parts Like These . . . In Production Quantities With a

Lapmaster®

Air brake valve parts like these are being production lapped on JOHN CRANE Lapmasters every day at a tremendous savings in time and money. For instance, one of the rotary valve seats shown here formerly required over two hours of lapping time to pass the "no leak" bubble test — time has now been cut to ten minutes on the Lapmaster.

This is the machine for you if you are looking for precision flatness and finish in quantity on all forms of ferrous and non-ferrous metal, ceramics, plastics or crystals. Lapmasters readily lap to the extremely close tolerance of one light band (.000011") or less. They also produce a fine finish to as low as 1 RMS.

You are invited to send us a few sample parts including surface finish specifications and approximate production requirements. Our lapping laboratory will then be in a position to provide you with complete facts on the application of the Lapmaster to your work. There is no obligation.

Crane Packing Co., 6470 Oakton St., Morton Grove, Ill. (Chicago Suburb)
In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N., Hamilton, Ont., Canada

Agitator tank keeps abrasive and vehicle in proper suspension
Solenoid valve controls correct flow of abrasive
Abrasive mixture flows down feed track
Mixture is evenly distributed over lap plate by rotating conditioning rings
Spent mixture drains off through serrations in lap plate
Conditioning rings serve as standard workholder
Conditioning rings keep lap plate flat automatically

*Protected by United States and Foreign Patents.

FREE TECHNICAL DATA

on the Lapmaster is available on request, also information on measuring flatness. Write for your copies today.

Lapmaster® DIVISION

CRANE PACKING COMPANY

38 YEARS INDUSTRIAL PROGRESS

The Katy ...SERVING THE GREAT SOUTHWEST

even better with 550 new cars equipped with Type F Couplers

Everywhere the trend is to Type F Couplers – by National – because of their inherent safety and efficiency.

Safest because – in event of derailment the interlocking wings keep cars in alignment with each other... prevent them from jackknifing, climbing or overturning.

Efficient because – Type F Couplers couple with any standard AAR coupler... are nearly 22 percent stronger than Type E Couplers...cut maintenance by minimizing free slack.

Always Specify Type F Couplers by **NATIONAL**

the name that means couplers

MISSOURI-KANSAS-TEXAS RAILROAD COMPANY

D. V. FRASER
PRESIDENT

RAILWAY EXCHANGE
SAINT LOUIS 1, MO.

The Katy's recent order for 550 freight cars equipped with the new Type F Interlocking Coupler marks our first large-lot order with Type F Couplers specified.

The Type F Coupler meets all the rigid requirements established by the Association of American Railroads' Committee on Couplers and Draft Gears. We found that, in addition to increased strength, it reduced slack between cars and lessened the possibility of jackknifing. It also prevents the mating coupler from falling to track in case of pull-out, thus avoiding derailments.

We specified the Type F Coupler because we think its superior safety features will increase operating efficiency and reduce costly breaks-in-two of our freight trains.

Donald V. Fraser

COUPLERS • YOKES
DRAFT GEARS
FREIGHT TRUCKS
SNUBBER PACKAGES
JOURNAL BOXES and LIDS

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY
Cleveland 6, Ohio

For MODERN PASSENGER CARS:

New Southern Pacific Dome Lounge cars make use of Met-L-Wood in modern interiors.

Original Beauty

in Panels
Partitions
Wainscoating
Doors
of

MET-L-WOOD

METAL BONDED TO PLYWOOD

Your designers have a wide choice of beautiful modern passenger car interiors when Met-L-Wood is the building material . . . Smooth, tough panels and doors, finished in steel, stainless, aluminum, Formica or Decorative Vinyls permit original beauty of design, plus these *practical* operating advantages of Met-L-Wood:

Fast Assembly	**Sound Deadening**
Light Weight	**Vibration Damping**
Insulating	**Lowest Maintenance**

Bulletins 520 and 521 give detailed data on Met-L-Wood doors and panels for passenger car interiors. Write for your free copies today.

MET-L-WOOD

CORPORATION

6755 W. 65TH ST • CHICAGO 38, ILL

FORMICA

PLASTIC-FACED
MET-L-WOOD

Met-L-Wood is the exclusive distributor of Formica products in the transportation industry. Now, you can use the many distinctive Formica designs—and excellent wearing qualities—bonded to Met-L-Wood panels and doors for unsurpassed beauty and utility in passenger car interiors. Full details on Formica-faced Met-L-Wood will be sent promptly on request . . . and don't forget Formica superiority for table, counter and washstand tops!

MOTOR WHEEL
"Center Articulated" Lid Design Gives A *Lifetime* Closure

Motor Wheel Standard and Deep Flange Lids can be removed or installed in a matter of seconds – and without tools. Time tested . . . oil and dust tight . . . full 4-way articulation. The extended housing arm facilitates raising lid, opens a full 120° for easy journal box service.

MOTOR WHEEL CORPORATION
LANSING 3, MICHIGAN U. S. A.

NATIONAL RAILWAY SALES REPRESENTATIVE

T-Z RAILWAY EQUIPMENT CO., G. S. Turner, President
8 SOUTH MICHIGAN • CHICAGO 3, ILLINOIS

Precision Parts by MAGNUS mean LONGER, SAFER MILEAGE for Diesel Locomotives

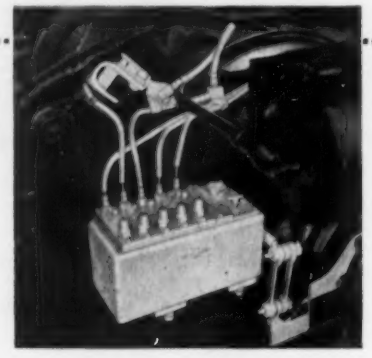
- *Perfectly mated bearing halves*
- *Heat-resistant Satco lining metal*
- *Interchangeable double keeway*
- *Available for all makes and types of diesel-electrics*

High Mileage

traction motor support bearings for LONGER ROAD LIFE

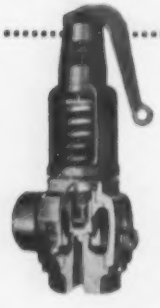
The extra precision that goes into Magnus traction motor support bearings pays off in longer, trouble-free mileage on the road. Quality control of metal mixes, high precision boring and final testing of mated bearing halves *under load* assure an extra margin of dependability — you can't buy a better bearing.

These Magnus HIGH-MILEAGE bearings are available for replacement on all types and makes of diesel-electric and electric locomotives and MU cars. For the complete facts, get your free copy of Bulletin No. 6000.



D-16 FLANGE LUBRICATOR increases mileage between wheel turnings up to 40%

This new, *more positive* method of flange lubrication not only gives greatly extended wheel life, but substantially reduces shop costs, too. Oil pressure to each flange is positively controlled by six individually adjustable pumps that are gang-operated from a common linkage to the truck frame. Unit operates only when locomotive is moving. Can be used to lubricate center pin wear plate also, if desired. Full 16-pint capacity for extra mileage between refills. Write for complete information.



MAGNUS 391 SAFETY VALVE

for dependable overload protection on diesel locomotive steam generators

This high-precision safety valve is specially made for railroad service on diesel locomotive steam generators. Opening and blowdown pressure adjustments are easily accessible and self-locking. Flexible metallic bellows prevent escape of steam into the generator compartment. Write for full details.

MAGNUS Metal Corporation

subsidiary of
NATIONAL LEAD COMPANY

111 Broadway, New York 6, N. Y.
80 E. Jackson Blvd., Chicago 4, Ill.

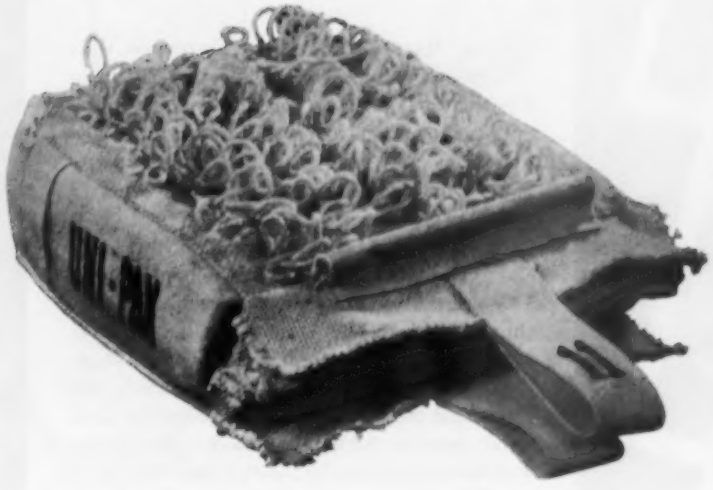
8,400,000 CAR-MILES

—No journal Bearing Failures!

for 670 UNI-PAK® Patented equipped hoppers

in 12 months of continuous service

(details of this intensive-in-service test supplied on request)



120,000 UNI-PAK Lubricators giving exceptional service on 30 Railroads

36-month repack period authorized
(on limited basis)
Gives maximum service

UNI-PAK's 3 way Constant FILTERED oil feed for better, safer journal lubrication

The exclusive UNI-PAK design features: (1) Three-inch pad of foam neoprene that holds 6-7 pounds of oil—*more than any other lubricator.*

(2) Specially developed lubricating yarns, continuously sewed through the neoprene pad and terminating in loops at top and bottom, deliver a *constant feed of filtered oil.* These yarns will not glaze.

(3) Rugged cotton body increases capillary attraction; buffers keep pad properly positioned and take up wear at fillet and collar.

WRITE FOR FULL DETAILS

UNI-PAK CORPORATION

BOX 8302 SWISSVALE, PA.

366 MADISON AVE., New York 17, N. Y. • 120 SO. LA SALLE ST. Chicago, Ill.

How the use of NATIONAL Seamless EXTRUDED Stainless Tubing *cuts nut manufacturing costs*

USING NATIONAL Seamless EXTRUDED USS Stainless (type 303) Tubing, the Tri-Clover Division of Ladish Corporation is now turning out hexagonal nuts in less time and at lower cost than they could using solid bar stock. The savings in material cost alone amounts to 11.77 cents per piece.

All machining on the nuts, except threading and O.D. finishing, is done in one operation on a 6-spindle, 3½ inch Conomatic automatic machine. A saving of five seconds in the time cycle was made by using the extruded hexagonal stock versus bar stock. The use of hex tubing has eliminated the cost and upkeep of boring tools —and, because tubing is considerably lighter than bar stock, it can be handled faster and with less difficulty.

NATIONAL EXTRUDED Tubing offers you high strength, uniformity, and dependability that only *seamless* tubing can give. For a better precision part, involving fewer operations and fewer machine hours, investigate NATIONAL Seamless EXTRUDED Tubing—made by the world's largest manufacturer of tubular steel products. Feel free to call our engineers if you'd like help in applying NATIONAL Seamless to your product.

* * *

National Tube employs a hot-extrusion process known as "Sejournet" in which white-hot billets of steel are squeezed into tubing of various shapes by a 2,500-ton hydraulic press and ram—a manufacturing method that insures absolute uniformity of wall strength.

NATIONAL TUBE DIVISION
UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

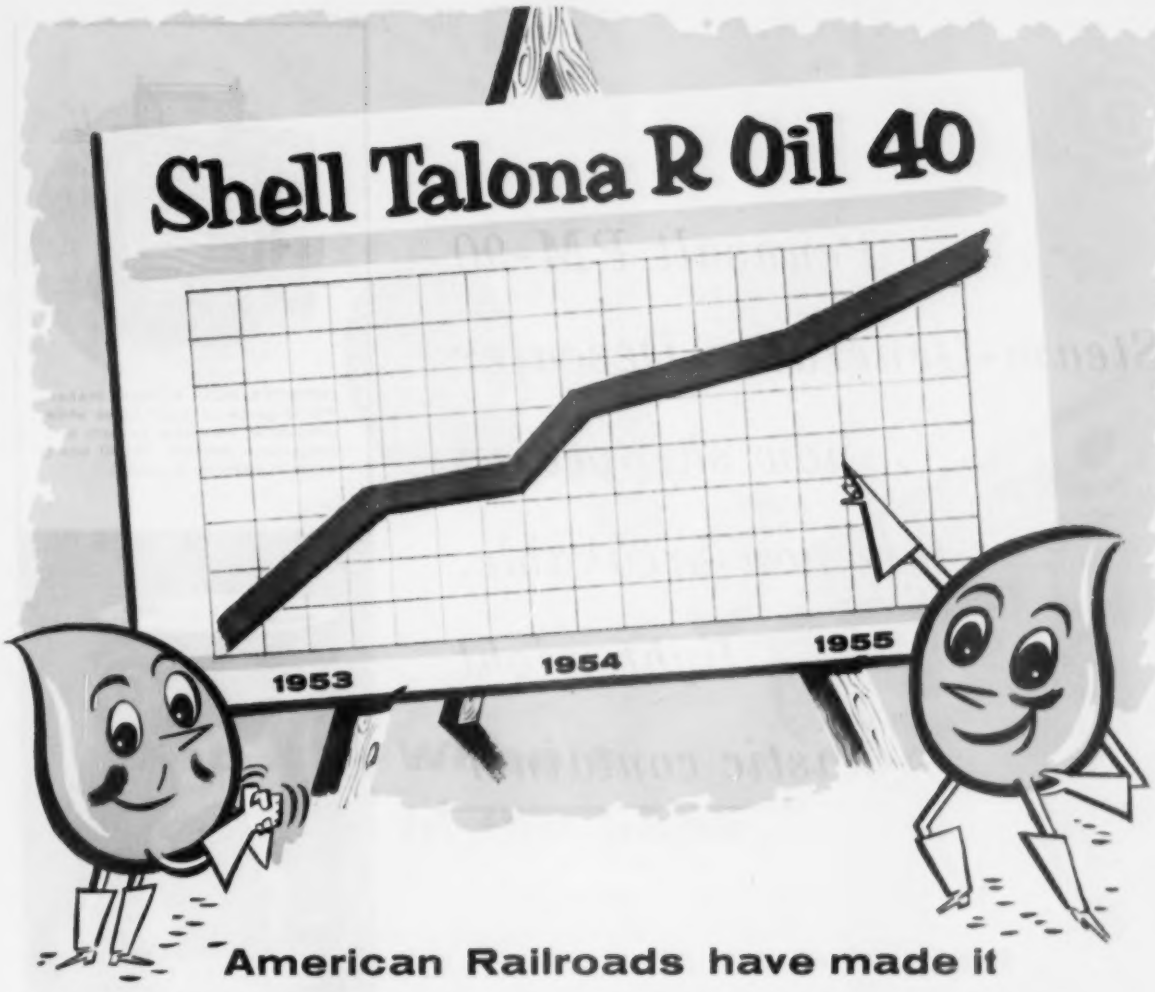
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL Seamless EXTRUDED TUBING

SEAMLESS WALLS WITHOUT WELDS

UNITED STATES STEEL



American Railroads have made it the fastest growing diesel locomotive lubricant in the U. S. A.

The acceptance of Shell Talona R Oil 40 by American railroads has been remarkable. Today, whether judged by number of units or horsepower, this lubricant is outstripping all others in rate of growth.

There is good reason for this: Maximum engine performance can be expected when you use Shell Talona R Oil 40.

Superior anti-wear protection

Greatly reduced wear on pistons, rings and cylinder walls is assured because of the selected combination of additives used in Shell Talona R Oil 40.

Maintains engine performance

The balanced formula of Shell Talona R Oil 40 combines high oxidation stability and anti-corrosive power. It prevents fouling and has excellent detergent-dispersant action.

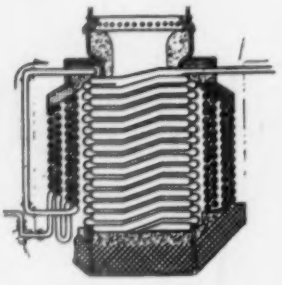
For further information write to the Shell Railroad Sales Department.

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California
Shell Building, St. Louis 3, Missouri

SHELL

Pennsalt PM-90 Steam-Generator Descaler now shipped in this non-breakable, lightweight plastic container



INHIBITED-ACID ACTION makes PM-90 gentle to boiler tubes while efficient in dissolving calcium and magnesium deposits. PM-90 won't erode or embrittle the metal.

Be sure of really safe, fast monthly washout of diesel steam-generator boilers with Pennsalt PM-90® inhibited-acid descaler! This accurately-balanced, concentrated cleaner is safe to the delicate metal surfaces of boiler tubes, yet thorough in removal of baked-on water scale. Long known and used in unhandy glass carboys by railroad maintenance men, PM-90 is now shipped in non-breakable plastic-lined steel drums—and thus freight savings and complete safety in handling are added to the advantages of PM-90 as a boiler cleaner.

New container saves freight, space, time . . . The new polyethylene-lined drums are one-third the weight of glass carboys, take up half the space. Because they're available from four widely-dispersed shipping points, and because their safety and compactness put them in the lowest ICC classification, your freight costs are substantially reduced. These rugged drums can be stacked to the ceiling of your warehouse or to the top of a freight car, and handling a full drum is a one-man job. Each drum has standard plugs and can be equipped with spouts for convenient use of PM-90.

Ask your Pennsalt man . . . Your Pennsalt Railroad Maintenance Specialist will gladly demonstrate PM-90 for you. Call him today, or write Metal Processing Dept. 275, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: Woolsey Bldg., 2168 Shattuck Ave., Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

Pennsalt Chemicals

Chilled Car Wheels are dollars in the bank

You start saving money even *before* you buy these wheels, because fast delivery from the nearest AMCCW plant permits you to maintain a very low wheel inventory.

After you have bought these wheels you save again because of their lower first cost and lower freight charges from the nearby AMCCW plant. Then you save again with lower machining costs and easier mounting.

Even after an AMCCW wheel has lived its long life, the savings continue. Short hauls to the nearest AMCCW foundry and low exchange cost for new wheels combine to keep replacement costs to the very minimum.

In good supply
Available locally
Short-haul delivery
Reduced inventory
Low first cost
Low exchange cost
Increased ton mileage
High safety standards
AMCCW plant inspection
Easier shop handling

Association of Manufacturers of Chilled Car Wheels

445 North Sacramento Boulevard, Chicago 12, Illinois

ACF Industries • Southern Wheel (American Brake Shoe Co.)
Griffin Wheel Co. • Marshall Car Wheel and Foundry Co.
Albany Car Wheel Co. • Pullman-Standard Car Mfg. Co.
Canada Iron Foundries, Ltd.

This is the third in a series of advertisements about the people of Standard.

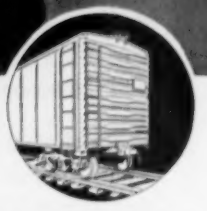
His hand is on the throttle . . . at Standard

This is R. Arthur Williams, Standard Railway president, a railroad equipment man all of his business life.

For many years he has served as an officer of the Transportation Association of America and on the Executive Committee of the Railway Progress Institute. As head of the Standard team, his railroad interests and services are broad.

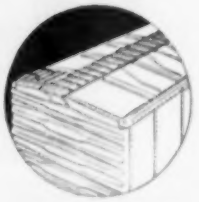
Art's specialty is obvious—he keeps this vast organization running smoothly—whose purpose and reputation is service to the carbuilders and railroads, keeping cars on the line, *producing*.

Whether your order is for one car or one hundred—for new car parts or for service on existing equipment—Art Williams and company at Standard Railway are "at your service".



Improved Dreadnaught End

Standard Railway components are *lighter* for equal strength, *stronger* for equal weight . . . *increased* car life . . . greater profitability.



Diagonal Panel Roof

Adds structural rigidity to the car. Costs less to buy and use. Makes money by keeping cars *on the line*.

Standard RAILWAY EQUIPMENT MANUFACTURING COMPANY

GENERAL OFFICE: 4527 Columbia Ave., Hammond, Ind. • New York • Chicago • St. Paul • San Francisco

Standard Railway Equipment Manufacturing Company, (Canada) Ltd., Sun Life Building, Montreal

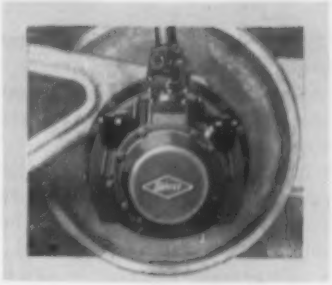
from ample electrical current supplied by the new ½ to 5 KW Spicer Generator Drive

Specific demands for electrical current in modern railroading . . . especially in baggage, mail, refrigerator and caboose cars . . . are met amply, steadily and reliably by the Spicer ½ to 5 KW Generator Drive.

The new Spicer Drive delivers the power for this ½ to 5 KW current with all the standards of efficiency and dependability established by the large, time-proved Spicer Positive Gear Generator Drive. More than 11,000 large Spicer Drives are now in use on over 70 railroads all over the world.

The Spicer Railway Generator Drive for radio, lights, refrigeration and other electrical equipment consists of a very simple application of quiet, long-lived spiral bevel gear and pinion mounted at the end of a standard axle, thereby permitting rapid inspection and maintenance. The drive from the gears is positive and constant through Spicer Universal Joints and Propeller Shaft to the Spicer Safety Clutch which is attached to the generator. This safety clutch absorbs heavy shock loads and disconnects the drive line in case of an excessive overload, thus protecting the generator from damage.

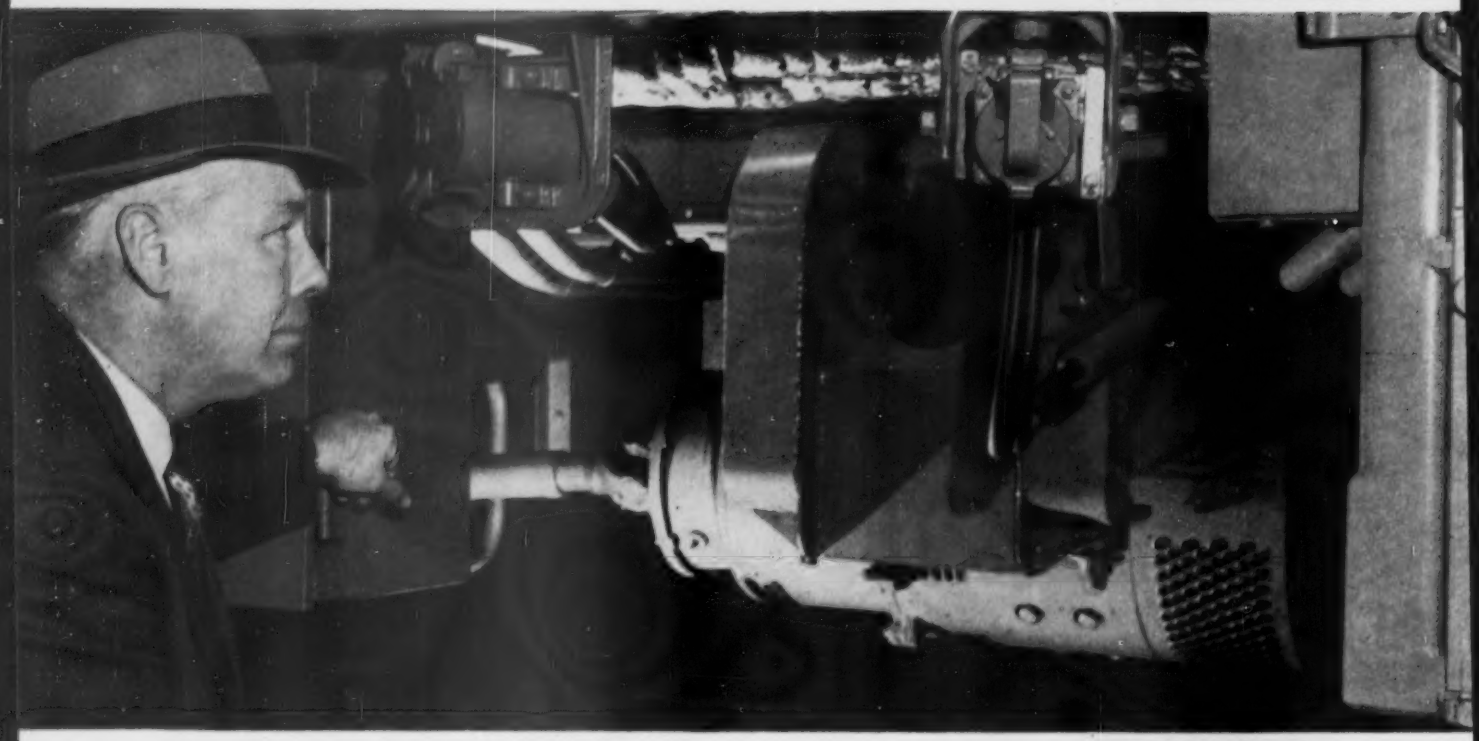
Spicer Positive Railway Generator Drive can be quickly and economically adapted to new car designs and reconditioning jobs. Write for further details.



Two models available: Model 2 for plain bearing axles, and Model 2-1 for roller bearing axles. Can be installed either vertically or horizontally.

Spicer

DANA CORPORATION
Toledo 1, Ohio

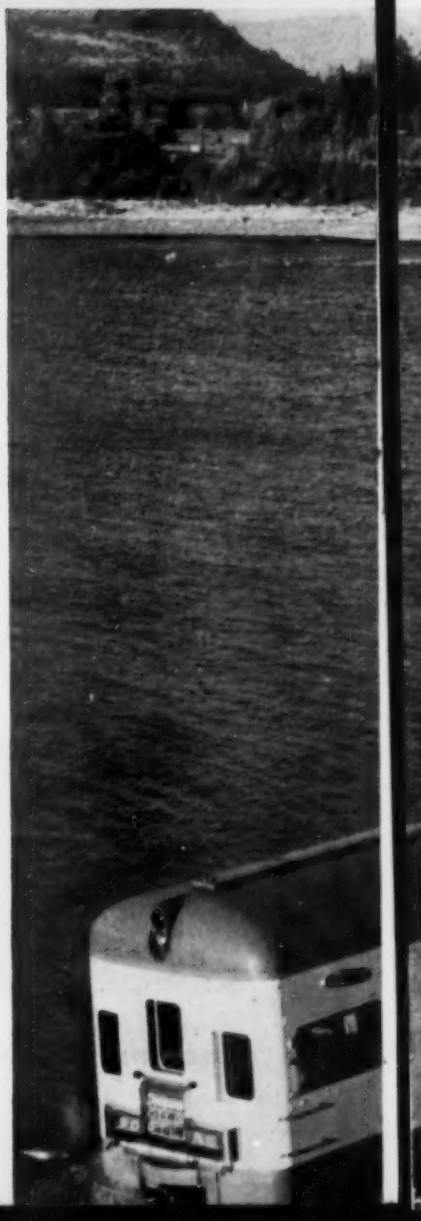


G-E Axle-driven Motor Generators Help Provide Comfort and Convenience Aboard Union Pacific Streamliners

General Electric's new GMG-162 axle-driven motor generator now in use on Union Pacific trains has more reserve power than competitive equipment. Here's what that means:

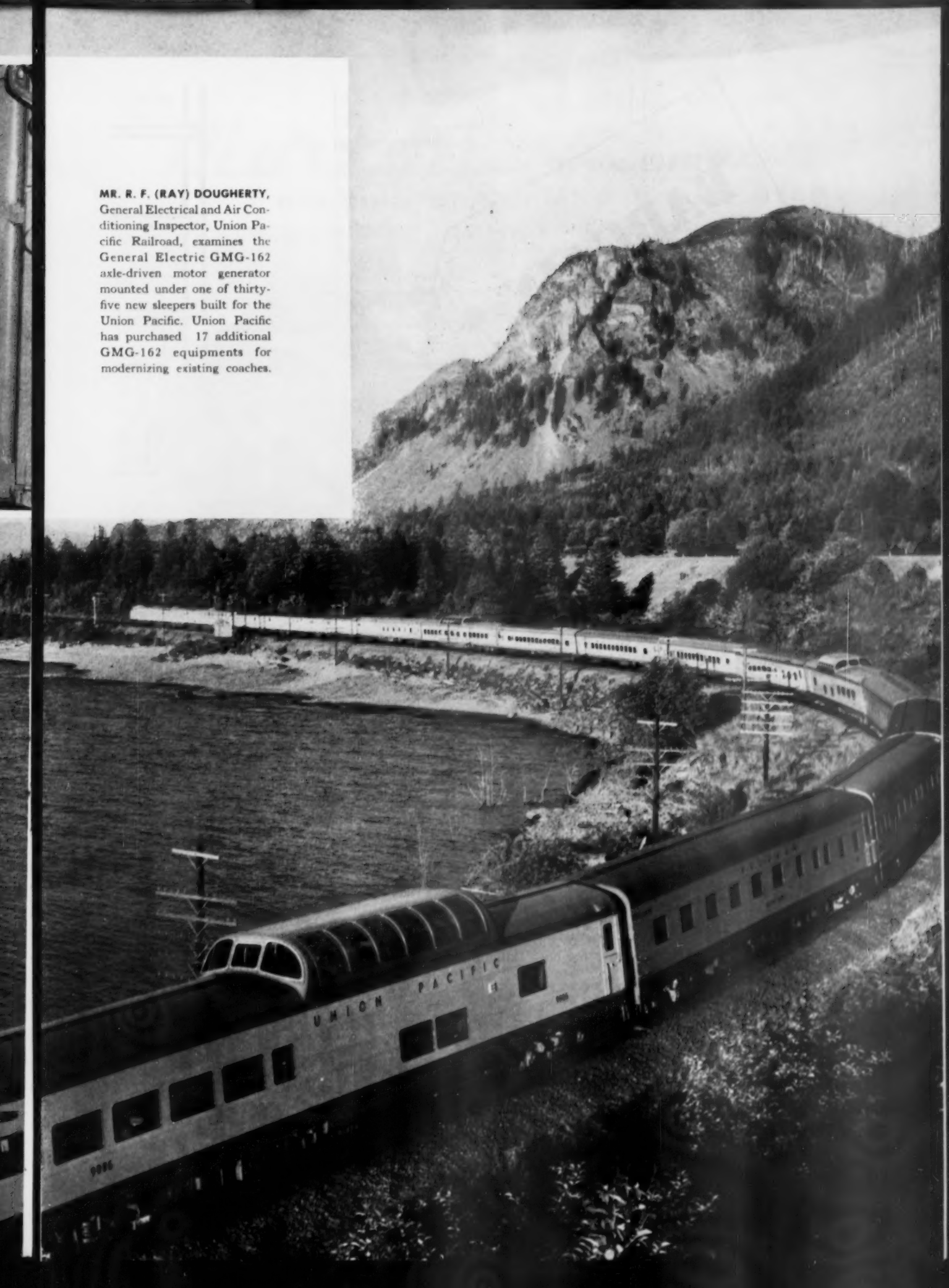
1. Better battery record. There is ample power available to charge low batteries while the car is in operation. Therefore, fewer standby rechargings are required.
2. Should axle generators in other cars become inoperative, increased demand can be met effectively. In a recent test simulating emergency conditions, load requirements of four modern air-conditioned passenger cars were supported by one GMG-162.

In addition, General Electric's GMG-162 has a highly simplified control system, uses only two control panels, eliminates armature reversing switch, and reduces number of moving parts. This results in low cost installation and maintenance. For more information contact your G-E Apparatus Sales representative. Locomotive and Car Equipment Department, General Electric Company, Erie, Pa. 115-10

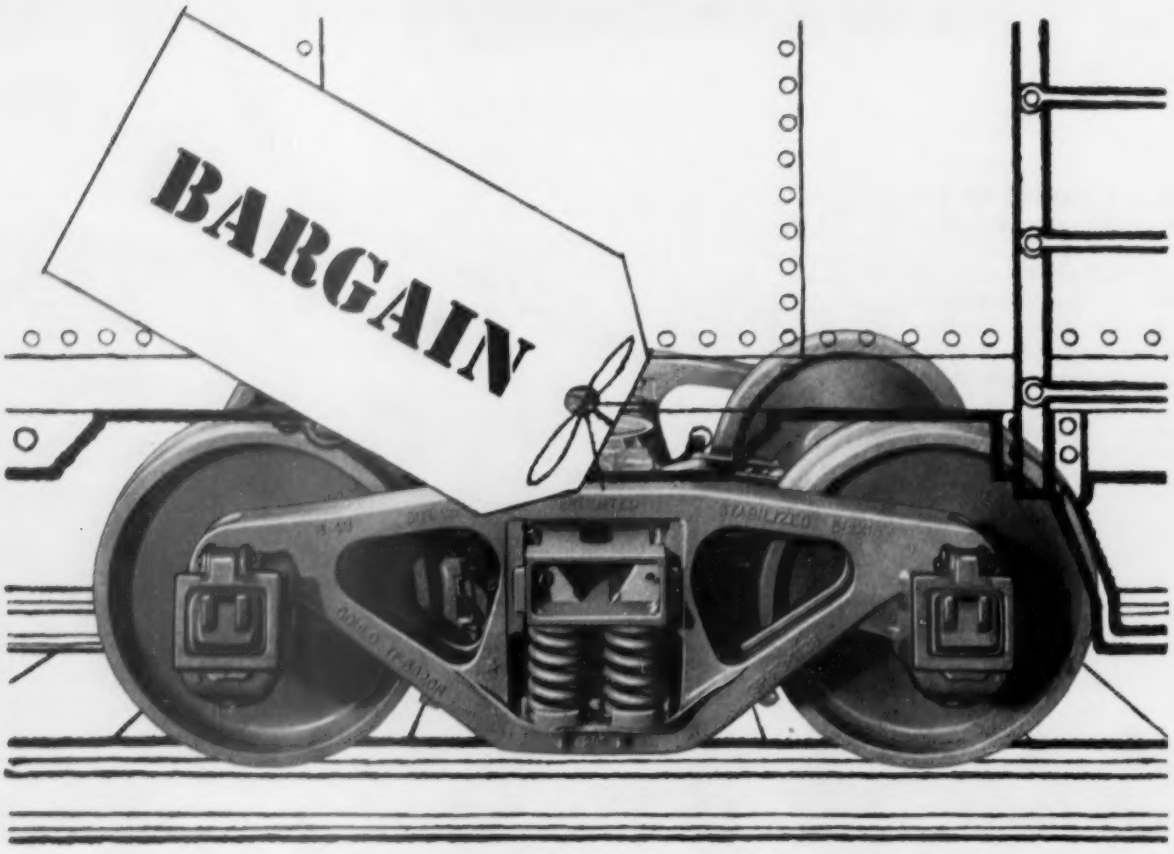


Progress Is Our Most Important Product

GENERAL ELECTRIC



MR. R. F. (RAY) DOUGHERTY, General Electrical and Air Conditioning Inspector, Union Pacific Railroad, examines the General Electric GMG-162 axle-driven motor generator mounted under one of thirty-five new sleepers built for the Union Pacific. Union Pacific has purchased 17 additional GMG-162 equipments for modernizing existing coaches.



COSTS SO LITTLE . . .
GIVES SO MUCH PROTECTION

Today Barber Stabilized Trucks are a greater bargain than ever because their savings are greater! Higher speeds mean more chances for costly damage to ladings and equipment.

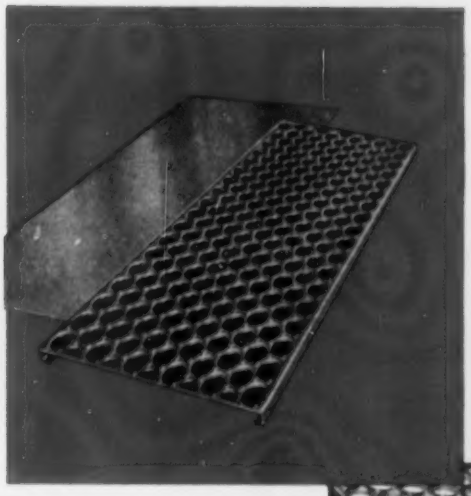
Barber Stabilized Trucks provide a safe, dependable system of suspension and protection. Actuating springs, friction shoes and wear plates work together as vertical dampers and truck resquaring devices. Bumps and bounces are cushioned and compensated, nosing and violent swivelling prevented. Thousands of damage claims are *completely eliminated;* your equipment is protected; rail pounding and track maintenance are reduced.

We firmly believe that *nothing* you specify does so *much* for your railroad yet costs *so little* as Barber Stabilized Trucks! Standard Car Truck Co., 332 S. Michigan Avenue, Chicago 4, Ill. *In Canada:* Consolidated Equipment Company, Ltd., Dominion Square Building, Montreal 2.

Specify Smoother-Riding

BARBER
STABILIZED TRUCKS

the Morton OPEN-GRIP
RUNNING BOARD AND BRAKE STEP



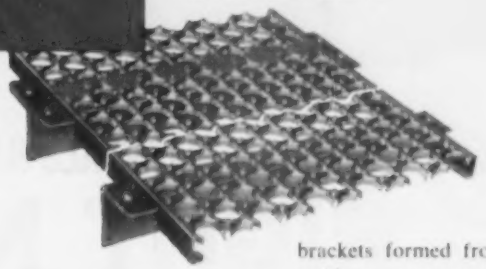
EXCLUSIVE ONE-PIECE CONSTRUCTION

Designed for ease of application, minimum maintenance and permanent sure footing.

"NO COST" MAINTENANCE — *One* piece of heavy gauge non-corrosive steel makes *one* piece of Open-Grip running board . . . no welds, joints or rivets . . . it *can't* break up. *GUARANTEED to last the lifetime of the car body!*

PERMANENT SAFETY — the perforated, raised Kass safety buttons with the self-cleaning "Open-Grip" design *always* provide a *positive* foothold under *any* weather conditions.

The unique design of the *adjustable* "cup-and-bolt" anchor eliminates precision work and greatly reduces application costs. A comparison of application costs between Morton Open-Grip and other running boards will tell the difference.



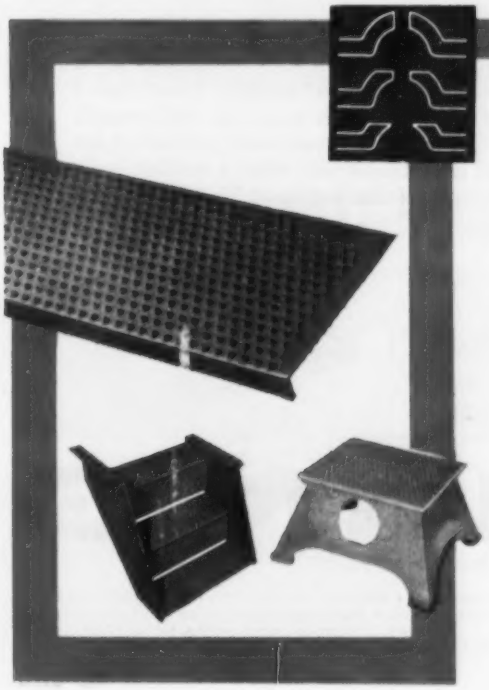
Self-cleaning—safe all year around. Hot dip galvanized after fabrication.

Strong—will withstand high distortional strain.

Versatile—used as: locomotive footboards, caboose platforms, step treads, catwalks, etc.

NEW RIVETED APPLICATION DESIGN

One piece construction continued! Application brackets formed from the board itself — no welds to come apart, or extra pieces for added weight.



KASS SAFETY TREADS

SELF SHARPENING BUTTONS. Stay safe as they wear - *lasting* anti-slip protection!

Famous Kass Safety Tread gives sure footing — positive foot-hold from all angles.

Versatility— fabricated of mild steel, stainless, aluminum or other alloys. Available in any size up to 36" x 120" and in thickness of 10, 12, 14 and 16 gauge. Flange arrangements as specified.

Economy–Morton Kass Treads are lower in cost, lighter in weight and wear longer. Simple installation — no maintenance problems.

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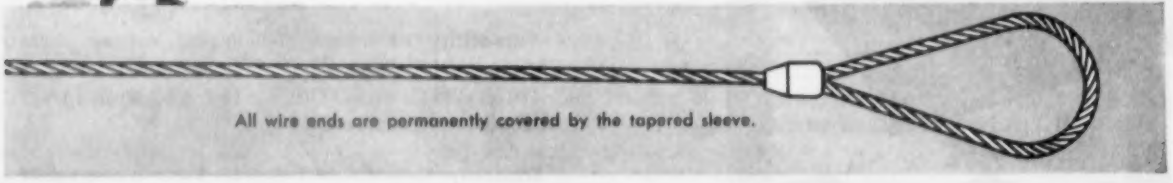
YOU CAN CUT MATERIALS HANDLING COSTS

RIGHT NOW

WITH "ALL-PURPOSE" SLINGS

SOON AS YOU PUT *All-Purpose Slings* on the job, handling speeds go up, handling costs come down! These slings are delivered ready for work. They're all-steel, highly resistant to kinking and crushing. Their tapered sleeve splices with the unique rolled eye further assure full rated strength of the wire rope itself. And, if you wish, the tapered sleeve attachment can be supplied with a galvanized steel thimble plus either a weldless hook, link or shackle. Write for descriptive folder and order All-Purpose-Slings for new time- and dollar-savings.



All wire ends are permanently covered by the tapered sleeve.

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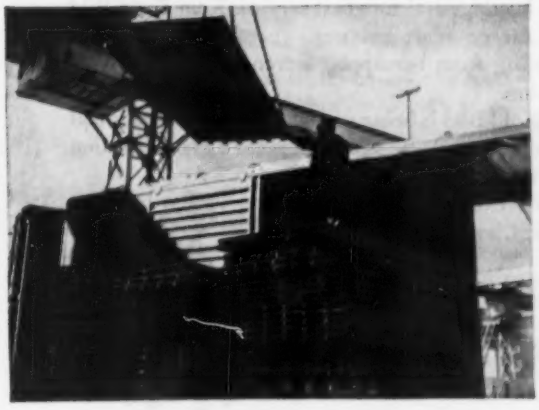
Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2953 FREDONIA AVE. • CLEVELAND, 19225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6816 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST.• EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Installing N-S-F in a new boxcar at ACF Industries, St. Louis.

N-S-F* helps



Panels of N-S-F awaiting installation in a new boxcar. This car is part of a large order recently filled by ACF Industries.

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With NAILABLE STEEL FLOORING in freight cars—new or used—railroads can effect substantial savings over the years on original investment and maintenance costs. With this modern flooring, progressive railroads can furnish shippers with Class A cars for all kinds of lading.

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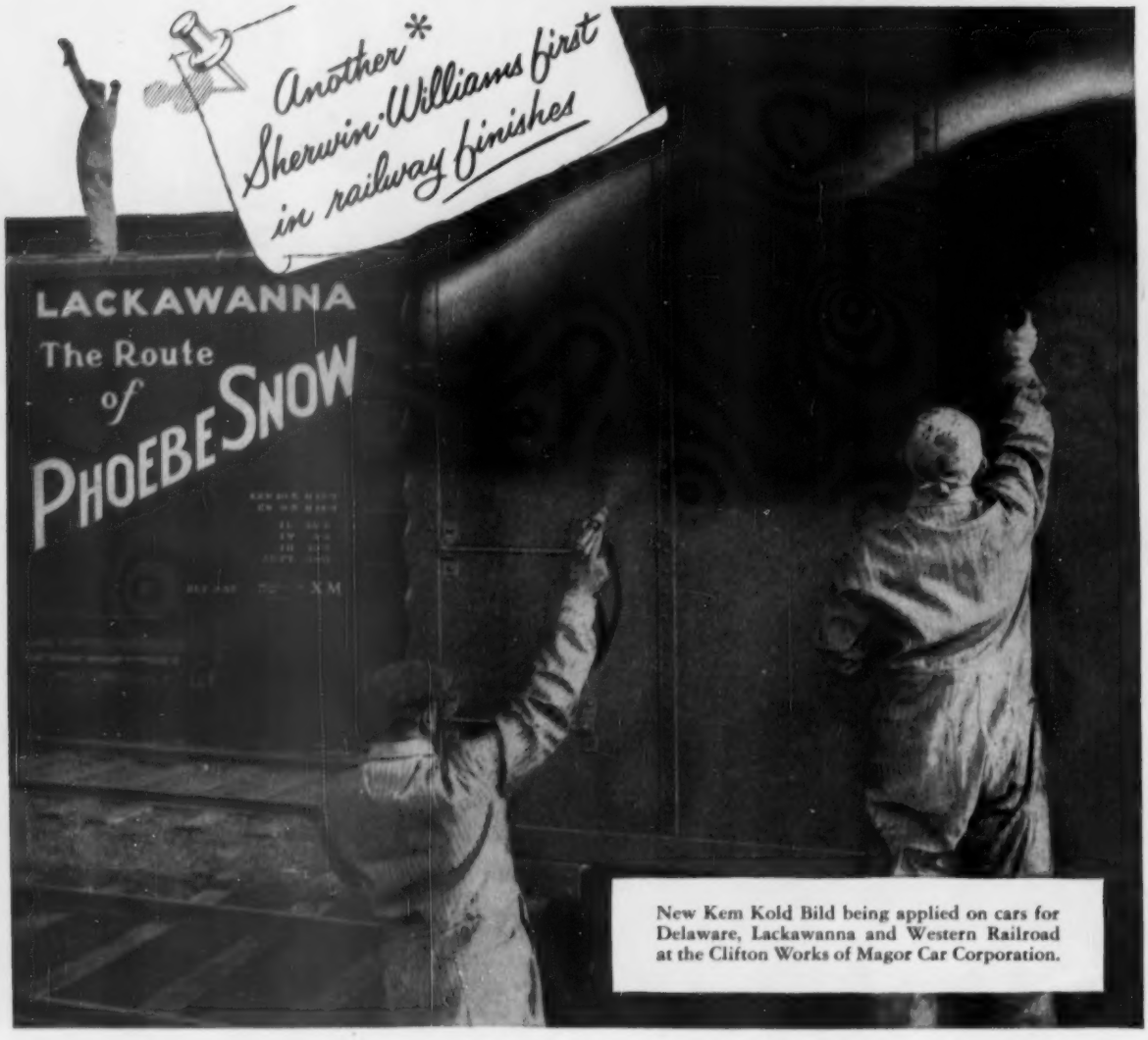
55-58-58



New Kem Kold Bild being applied on cars for Delaware, Lackawanna and Western Railroad at the Clifton Works of Magor Car Corporation.

*Once over with KEM KOLD BILD† does the job of two standard coats!

Now you can cut material and out-of-service costs by eliminating time for drying and application of a second coat. One full coat of Kem Kold Bild does it using conventional spray equipment. Kem Kold Bild dries in 1½ hours, is ready for stenciling in 2 to 3 hours. You get good film flow with a minimum of overspray. And a dry-film thickness as heavy as 2½ mils.

This cold-spray synthetic enamel produces a bright gloss of exceptional durability, too. Withstands repeated cleanings and toughest service. Kem Kold Bild doesn't lift or affect primers. There's no pin-holing or bubbling from entrapped solvents during or after application.

Kem Kold Bild is being used by leading railroads and car builders now. Why not arrange for a demonstration by contacting The Sherwin-Williams Co., Transportation Division, Cleveland 1, Ohio.

†Trade-Mark

SHERWIN-WILLIAMS RAILWAY FINISHES

Why NATIONAL TRADE-MARK *brushes are best for*

Passenger Service

Here are some of the requirements brushes must satisfy in traction motors, generators and auxiliary equipment on passenger-service locomotives . . . and why "National" brushes perform better and cost less than any other brand:

1. **Long Life for Long Runs**—"National" brushes have an outstanding record for continued improvement of service-life characteristics.
2. **Better commutation for smooth, fast starts** — "National" brushes give smooth power-transition with minimum equipment-maintenance for either short runs or long hauls.
3. **High strength for high impact** — "National" brushes, shunt connections and cables are carefully engineered to provide maximum assurance against mechanical failure.
4. **Improved commutator condition for minimum maintenance** — the superior film-forming properties of "National" brushes are the result of the most extensive brush-development program in the Railroad Industry.

Not only in passenger service but in *all* types of diesel-electric locomotive operation, "National" brushes deliver more for your brush dollar. Specify "National" — the brand proved by performance and used more than all other brands combined!

NATIONAL TRADE-MARK **BRUSHES**

Best For All Types Of Equipment . . .
Preferred For All Types Of Service.

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation
NATIONAL CARBON COMPANY • A Division of Union Carbide and Carbon Corporation • 30 East 42nd Street, New York 17, N. Y.
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto

Join the Airtac Parade

YOU, TOO, will want to join the *Texaco Airtac* parade when you see the great job it does on all panel-type railroad air filters – the smooth, uniform coverage (no "webbing" or dry spots), the high dust retention resulting in increased cleanliness and reduced engine wear.

Texaco Airtac – a special gel-type oil has remarkable stability, water separation and antifoam characteristics under application temperatures. It does not creep or drip in service even at temperatures as high as 185° F. *Texaco Airtac* is easy to apply, easy to remove, economical.

Let a Texaco Representative help you get maximum collection efficiency from your filters. Just call the nearest Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis or Atlanta. Or write:

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The Texas Company, *Railway Sales Division*, 135 East 42nd Street, New York 17, New York.

TEXACO **TEXACO Railroad Lubricants** AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

EDITORIALS . . . . . .

Can Light Cars Be Mass-Produced?

A Texan who saw a giraffe for the first time, looked at it for a while and said, "That was designed by a committee." Similarly, any passenger car made to meet the real or imagined needs of all railroads for even one class of service, would be a queer looking thing indeed.

Traditionally, railroads have ordered passenger cars to meet specific needs. For example, in the period 1945 through 1953, Pullman-Standard built 1,235 domestic, non-sleeper passenger cars from 151 different floor plans for 41 different customers. Forty-three per cent of these had less than 3 and 73.5 per cent had less than 7 cars per plan.

That takes care of the giraffe problem all right, but it also throws a large increase of cost into a service which has long earned a deficit for the railroads. Perhaps special cars are necessary to keep passengers riding the railroads, but they are evidently insufficient to stop the flight of traffic to air and highway competition.

The new lightweight trains offer an opportunity to produce transportation at a cost which might permit profitable operation. At present they are being built in a variety of designs. This presumably is essential to the production of a type that will meet the great majority of needs, but the potentials of some kind of standardization and mass production should not be overlooked. A giraffe is not the answer, but looking into the near future there is an opportunity of reducing all designs to some kind of a common denominator.

Presenting a "How-To-Do-It"

Today's education embraces the theory that the most effective way to teach something is to make clear the fundamentals, either verbally or visually by illustration and the printed word. The "student" can become thoroughly familiar with the subject if it is simple and interesting for him to do most of the rest of the learning by himself. Lasting impressions are those that are obtained by personal participation.

This method of education reached its peak during the war years. The knowledge obtained and the skills developed by millions of men in the armed services attest to its success. When the diesel-electric locomotive came into service, the job of educating railroad men almost overnight relied on these methods. There was the invaluable help from schools set up by the locomotive builders.

The air brake is one of the complex devices that we have to contend with on railroads. Many men are satisfied to know that if you do THIS, THAT will happen. But there's always the fellow who wants to know *why*. Here is a chance to find out; starting on page 75 anyone interested in 24RL air brake will find the first of an easy, self-study series. This is an easy way—taking the air brake apart and laying it out in sections, each simple to understand. If you like this idea, let us know. There's almost no limit to its application.

NEW BOOKS

THE MACHINIST DICTIONARY. By Fred H. Colvin. This dictionary was compiled to present information concerning machine terms, parts, and standards in a comprehensive form for quick reference. One of the author's principal aims in doing this was to make information readily available which would avoid confusion arising from misuse of mechanical terms. Definitions cover the field from "ABC screw threads" to "zirconium". The book is well illustrated with photographs and drawings of machines, machine parts, and mechanical components. Typical of the dozens of tables are those on Morse tapers, music wire sizes, and linear coefficients of expansion for various materials. The author spent 40 years writing for *American Machinist* magazine, and is now editor emeritus. He is a fellow of the American Society of Mechanical Engineers. He has written over fifty books dealing with machinery and machine shop practices.

Simmons-Boardman Publishing Corporation, 30 Church street, New York 7. Price $7.50.

HYDRAULIC AND PNEUMATIC OPERATION OF MACHINES. By H. C. Town. The scope of this volume is well described by its subtitle—A Handbook on the Use of Oil or Compressed Air for Driving and Controlling Machines and Vehicles. Because it is written by a professor of engineering at a British college, most of the examples are English hydraulic and pneumatic equipment. There is good presentation of hydraulic and pneumatic principles and applications in the mechanical engineering field. Most previous publications dealing with hydraulic power have been applicable mainly to the work of the civil engineer.

Here are described and explained those applications where oil is used for transmitting force and where its velocity is used in hydrokinetic devices such as fluid couplings, torque converters and hydraulic rotary drive. The use of compressed air for machine actuation and for the operation of jigs and fixtures are growing phases of production engineering dealt with in Part II. Basic principles, circuit diagrams and control problems are discussed in both the hydraulic and pneumatic field.

Philosophical Library, Inc., 15 East 40th street, New York 16. Price $7.50.

Here's why FREIGHT CARS NEED SOLID JOURNAL BEARINGS

It's not just a question of low initial cost: you also choose solid-type bearings because they offer the utmost in load capacity, protection for lading, ease and simplicity of maintenance and many other advantages. They all add up to a BIGGER NET RETURN per car dollar invested.

SURE, you get up to 10% more cars for your money, up to 10% more car availability, and hence more freight revenue per car dollar invested with low-cost solid bearings. But there are many other inherent advantages, too. Let's take a quick look.

1. Unrestricted as to Speed and Load

Steel, stone, ore—you can take the biggest loads with solid bearing cars—right up to axle capacity. Solid bearings reduce these maximum loads to about 700 psi—well within bearing and oil film capacity. (Compressive strength of the babbitt at highest normal temperatures is over 7200 psi.)

What about speed? Oil film pressures increase with speed. You get a thicker film of oil that more than compensates for any viscosity change. *With solid bearing cars you're actually better off in the higher range of freight train speeds.*

2. Ease and Simplicity of Maintenance

The AAR journal bearing assembly is a simple standard. Internal parts can be easily inspected or removed—without special tools or equipment, with the minimum of effort and time.

There's no need for expensive shop facilities or skilled labor. Stocking of parts is simple and replacements are available at any repair point of any line. And unlike other bearing types, in the event of road failure you can almost always make necessary repairs and bring a solid bearing car in on the same wheels.

3. Greater Protection for Lading

With solid bearings lading gets the smoothest possible ride on standard freight car trucks. That's because lateral shocks are flexibly controlled—not rigidly opposed. This means less wear and tear on car bodies, trucks, wheel flanges and rails, too!

4. Weight and Resistance Advantages

In motion the solid bearing glides on a film of oil like a skater on ice. Dynamic resistance is as low or lower than that of any other type of bearing—averages less than one pound per ton regardless of the outside temperature or speed of operation.

Solid bearings also save many tons unsprung dead weight on every moving train. Lighter weight, plus lowest possible resistance in pounds per ton, puts the maximum tractive effort of the locomotive to the business of moving goods.

5. Improved Dependability in Freight Service

Solid bearing performance is getting better all the time. In 1954, there was only one set-off for every 15 cars—equivalent to each car operating 15 years per road failure of a bearing. And this average car was almost 20 years old. You can bet that other bearing types would have a tough time trying to beat that record.

Better still, means are now available to reduce journal box servicing requirements and get still better solid bearing performance. Improved bearings and lubricators are now being installed. Periodic servicing—on a calendar basis—and 3-year repacks will not be far behind.

You save money in many ways with solid bearing cars, and you will save even more in the future. With so many inherent advantages, you just can't beat solid-type bearings for railroad rolling stock!

Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

MAGNUS

Solid Bearings

MAGNUS METAL CORPORATION

Subsidiary of **NATIONAL LEAD COMPANY**

High-hooded road switcher, the Alco DL-701, has space for both dynamic brake equipment and steam generator. This four-motored 1,800-hp unit will be followed by a six-motored version, the DL-702.

Redesign, new engine produce . . .

Alco's 1800-Hp Road Switcher

DL-701 first locomotive built to incorporate new 251 engine

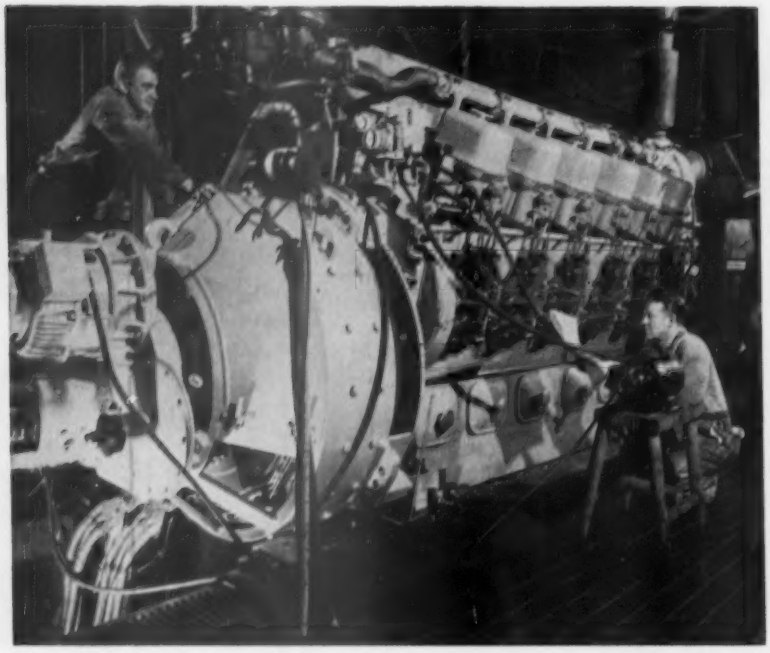
The Alco four-motored diesel-electric road switcher, the DL-701, is powered with a newly designed 12-cylinder 1,800-hp V-type diesel engine.

The new engine is the model 251 which is now replacing the former standard 244 which has been rated at 1,600-hp.

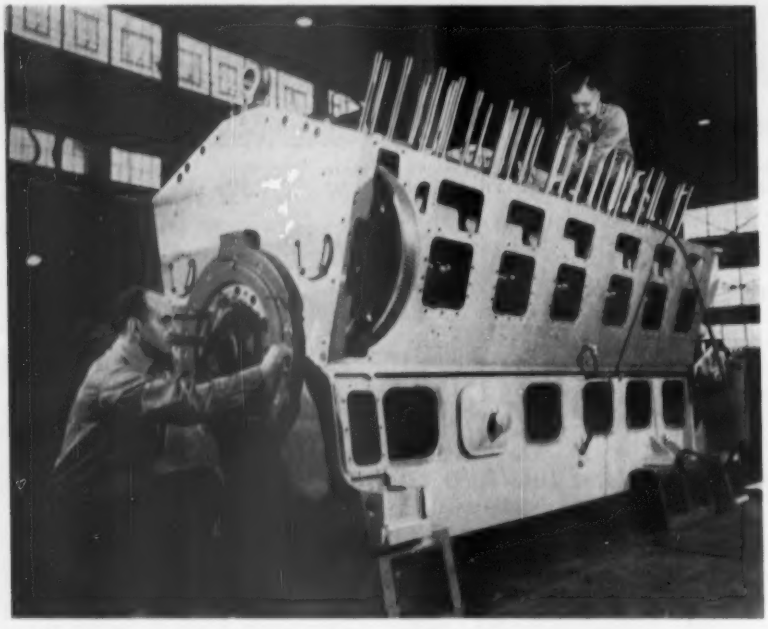
The 251 engine eliminates the free-end casing, camshaft idler gears and camshaft casing, water jackets and generator adaptor used in Alco's Mod ' 244 engine. The 251 is turbo-supercharged and has an air-intake aftercooler that lowers temperatures in all combustion-affected parts. Working parts in the engine are totally enclosed to decrease wear, and a new fuel-injection system was designed to be dilution-proof.

Cylinders in this new engine have 9½-in. bore and 10-in. stroke. To lengthen valve and cylinder head life, there are valve-seat inserts and hardened valve faces. The pistons have ni-resist inserts in the upper ring groove. The piston rings are heat treated to match them with the engine's chrome-plated cylinder liners. The cylinder block of the new engine is stronger and heavier than that of previous Alco engines. The 251 Vee-type has a wider and stronger center main bearing, with serrated fit between all seven main bearing caps and saddles.

The grooveless main and connecting rod bearings increase oil-film thickness. Thrust is absorbed by collars on each side of the center main bearing but these are not part of the



Alco 251 engines undergo a minimum of nine hours of running on plant test stand. Standard is General Electric generator, excitation equipment and governor. Covers have been removed from fuel pumps for test.



Welded crankcase of the 251 engine features simplified structural design, elimination of camshaft idler gears, and camshaft inside the crankcase.

Four Gear Ratios Available on DL-701

Gearing	74:18	65:18	64:19	62:21
Continuous Tractive Effort (LB)	53,000	46,500	43,400	38,000
Maximum Speed MPH	65	75	80	92
Maximum Curvature Hauling Train				30 Degrees

bearing shells. The new engine includes a positive-action, mechanical overspeed trip.

Static Control System

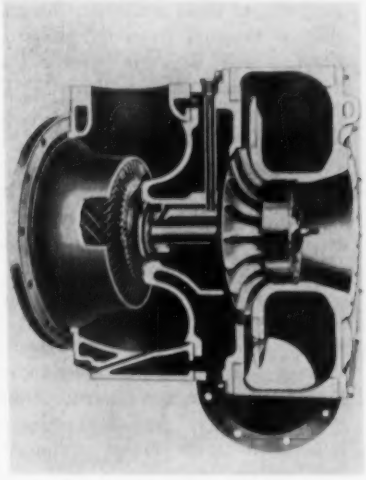
Improvements in the basic electrical controls offered in the DL-701 include a greatly simplified engine control with individual push-button start and stop and a simple, two-position engine-control switch with isolation and run positions. In fuel-rate control, the DL-701 governor provides timed rate of fuel advance that offers throttle-cushioned duty on the engine, cleaner exhaust during acceleration and permits throwing the engine on the line in transit.

An 8-point throttle controls engine speed over a range of 400 rpm at idle position to 1,000 rpm in the eighth notch. A simplified electrical control system with only one moving element prevents excessive generator current or voltage and insures that at each throttle position, the locomotive will receive constant horsepower at all locomotive speeds without engine overloading. To do this the control adjusts the position of the fuel racks.

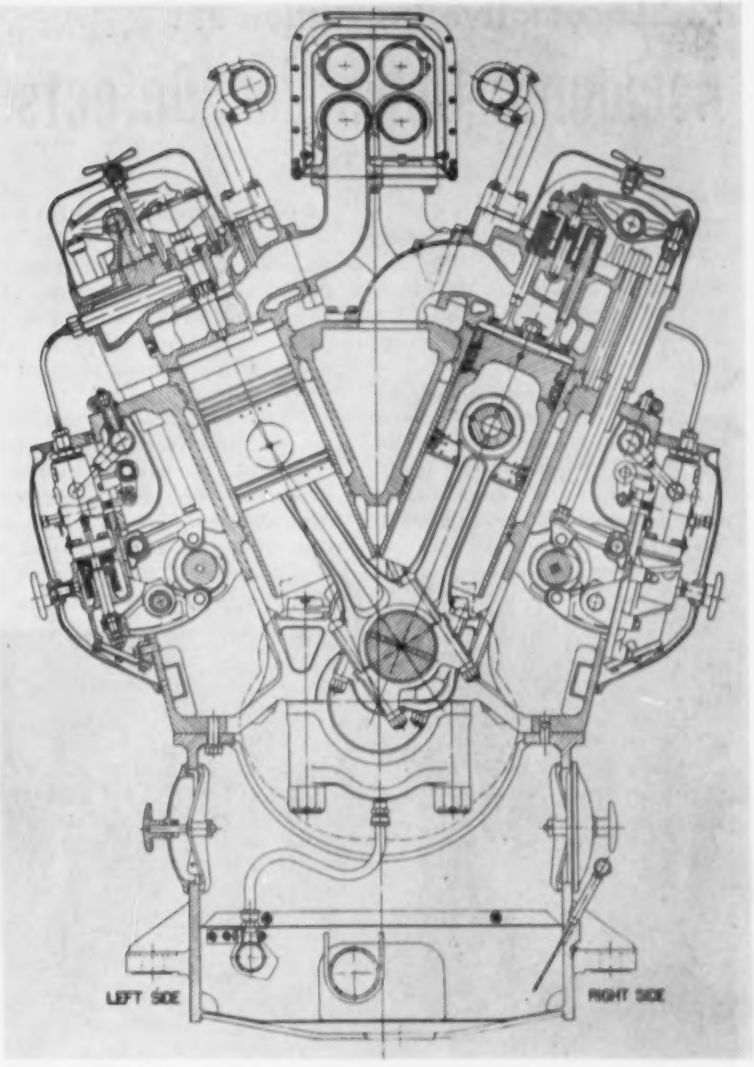
The moving element in the control system is a three-phase a-c generator geared to the engine. The generator voltage is proportional to engine speed and the output of the generator is further controlled by saturable-core reactors (static devices without moving parts). The reactors in turn are influenced by main generator voltage and current so that they prevent overvoltage and excessive current, and control main generator output to match engine output. Current from the a-c generator after being regulated by the reactors is rectified and used to excite the field of the main generator.

In addition to the main generator and the a-c control generator, the only other electrical machine is the auxiliary generator which furnishes direct current for operation of the control system and for battery charging. The total number of control relays has been drastically reduced, leaving only heavy-duty, tamperproof relays where required. The ground relay has a trip signal and reset button accessible in the cab without opening compartment doors. Nearly all amphenol connectors are replaced in the DL-701 by terminal boards, giving improved reliability and saving maintenance time and expense by cutting the number of

Fuel pump drive assemblies undergoing inspection. Back of units (left) extends into crankcase where camshaft is located. Face of the assembly (right) holds an individual fuel pump—one for each cylinder. Cap screws attach assembly to the crankcase.



Turbocharger on the Alco 251 engine delivers air to a water cooled aftercooler before it passes into the cylinders. Supercharger itself is water cooled also.



Piston and rod assembly can be pulled through liner on the 251. Air is delivered through center V and fuel system is designed to be dilution-proof.

soldered connections. All wire and cable is insulated with improved, neoprene-jacketed rubber and is installed in wire ducts. Traction motor blowers are mechanically driven from the crankshaft.

The static excitation system is intended to give high reliability and low maintenance. It contains only one rotating machine, a three-phase alternator with two slip rings and no commutator.

The system has positive inherent control of horsepower, voltage and tractive force. The system's static control is contained in four dead-front interchangeable panels which may be quickly checked and replaced if defective.

The DL-701 locomotive has number boxes angle-mounted and flush-mounted classification lights. The cab is longer, weather-tight and has two heaters with fresh-air intakes. Gages are of the dial type and are placed near control locations to permit convenient operation of the locomotive in either direction.

Characteristics

The locomotive has a wheel base of 40-ft 4-in. and a maximum height of 14-ft 6-in. Its maximum width is 10-ft 1⅝-in. and it is 56-ft 11¾-in. long inside the knuckles. The wheel base of each truck is 9-ft 4-in. and truck wheels are 40-in. in diameter. Roller-bearing trucks and a rubber draft gear are standard equipment on the DL-701. The locomotive's base weight is 240,000 lb and it can be ballasted to 260,000 lbs.

Among modifications available to meet customer specifications are gear ratios providing four choices of speed and tractive force. A high capacity dynamic brake system is automatically controlled by non-moving devices and has a new blower motor circuit.

Three steam generators are available for the DL-701, with individual capacities of 1,600, 2,750 and 3,500 lb-per-hr. Generator water capacity is 1,400 gallons.

Fuel capacity can be 2,600 gal. when the locomotive has no train-heating steam generator and water tank.

ICC Locomotive Inspection . . .

Accidents Down and Defects Up

The number of defects found on locomotives was about the same for the year ended June 30, 1955, as it had been for the previous year. However, the number of inspections was lower and the percentage found defective then increased from 9.7 to 10.1 per cent. The 44th Annual Report of the Director of Locomotive Inspection stated then that "as the age of diesel power recently placed in service increased, more maintenance attention will be required if defects are to be avoided."

A milestone was recorded in this report when "for the first time in the 44 years since passage of the act, a full fiscal year has elapsed without the occurrence of a steam locomotive boiler explosion." This is one more reflection of steam's minor role. Reported steam locomotives are only a third of the number reported five years ago.

All three fatalities recorded during the year were caused by electrical equipment. The greatest number of injuries assigned to a single locomotive component were the 60 resulting from failure of axles and journals. The breaking of the journal of an axle on a diesel unit derailed the two trailing units of a four-unit locomotive and 9 cars of a passenger train resulting in 59 of the 60 injuries.

WHEEL tread lamination shelled out to a depth of 1-1/16-in. with a length of 9-in. Tread had transverse checks around entire wheel circumference and flaking occurred at several of these checks. Wheel had not been turned and failed while diesel was hauling a passenger train.

Accidents resulting in deaths or injuries decreased from 105 in 1954 to 83 in 1955. The number of fatalities were three both years. The number of injuries dropped from 302 to 142. Greatest single cause of reportable accidents was the defective condition of floors, steps and passageways. Accumulation of oil upon walking surfaces was responsible for the majority of these accidents. Eight accidents resulted from defective cab seats which have frequently been found in dangerous condition by ICC inspectors. With 38 per cent of all accidents resulting from what the report terms "poor housekeeping," the ICC reports that emphasis has been placed upon action necessary to avoid further accident of these types.

Most frequent cause for ordering other-than-steam locomotives out of service during the year was condition of the internal combustion engines and their components. Other major causes in declining order of importance were brake equipment, fuel system, cab floors and deck plates, sanders, cabs and cab windows, and trucks.

ICC summary states that "there is a noticeable improvement in accident trend since the war years, which may be attributed in large extent to the conversion to diesel-electric locomotives. However, a corresponding improvement is not shown in data for percentage of inspected locomotives that were found defective. Since the effectiveness of [ICC] work is related to the mobility of [ICC] inspectors, satisfactory compliance with the requirement that each inspector see the proper inspections are made by railroads within his district is not practicable when inadequate travel funds restrict the time available for inspection at outlying terminals. It is therefore recommended that the necessity for adequate travel funds be stressed to the end that sufficient funds be appropriated to properly discharge specified inspection duties."

Where Are ICC Defects Being Found on Diesel and Electric Locomotives?

(Partial List of Defects)

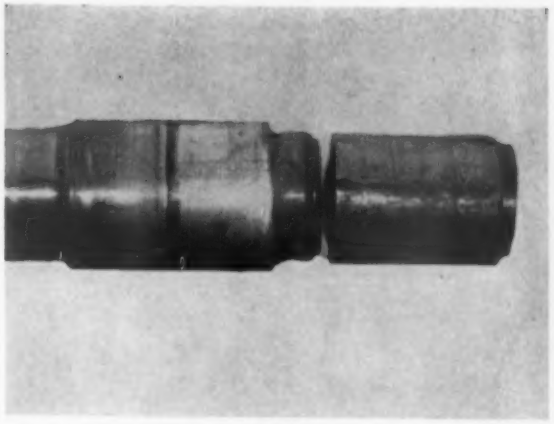
	1955	1954	1953
Air compressors	419	326	210
Boilers	203	175	103
Brake equipment	2,790	2,126	1,698
Cabs and cab windows	1,073	858	679
Cab floors, aprons and deck plates	1,677	1,703	1,589
Controllers, relays, circuit breakers, magnet valves, and switch groups	802	454	424
Coupling and uncoupling devices	204	139	95
Draft gear	336	291	218
Driving boxes, shoes, and wedges	249	154	128
Fuel system	1,833	1,951	1,853
Gages or fittings, air	226	136	138
Handholds	219	230	121
Internal-combustion engine defects, parts and appurtenances	5,035	4,848	4,564
Jumpers and cable connectors	214	178	156
Motors and generators	880	813	655
Sanders	1,492	1,200	1,224
Springs and spring rigging, driving and truck	306	241	178
Steps, footboards	737	622	505
Trucks	1,054	503	439
Wheels	282	257	212

What Do ICC Inspectors Find?

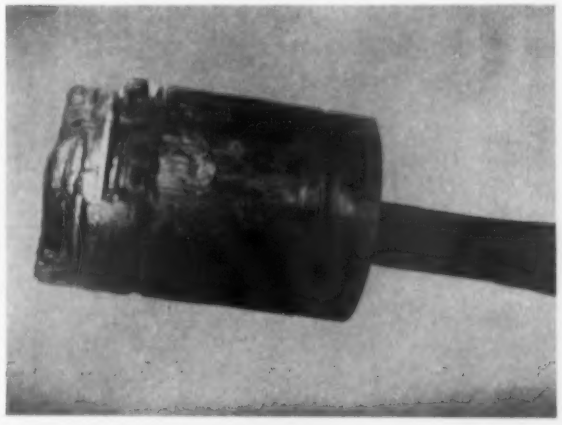
	1955	1954	1953
STEAM LOCOMOTIVES			
Number of defects	7,350	9,763	12,980
Locomotives reported	8,892	12,135	15,798
Locomotives inspected	12,128	19,999	28,899
Locomotives defective	1,784	2,599	3,583
Percentage of inspected found defective	14.7	13.0	12.4
Locomotives ordered out of service	96	117	163
LOCOMOTIVES OTHER THAN STEAM			
Number of defects	22,618	19,640	17,163
Locomotive units reported	28,100	27,135	25,374
Locomotive units inspected	85,897	83,338	75,170
Locomotive units defective	8,129	7,395	6,571
Percentage of inspected found defective	9.5	8.9	8.7
Locomotive units ordered out of service	127	140	118

Accidents and Casualties Caused by Failure of Locomotive Components

	1955		1954		1953	
Number of accidents	83		105		134	
	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:						
Engineers	1	26	1	37	4	37
Firemen	1	34	...	39	4	57
Brakemen	...	10	...	11	3	20
Conductors	...	4	...	4	...	8
Switchmen	...	4	...	3	...	4
Maintenance employees	1	4	2	12	...	8
Other employees	...	18	...	2	...	2
Nonemployees	...	42	...	194	1	14
Total	3	142	3	302	12	150



AXLE broken under diesel pasenger unit derailed train, injured 59. Journal has been built up with metal spray extending into the fillet. Break occurred in journal near wheel end of inner roller bearing race in this five-year old axle after 1,312,142 miles of service.



PISTON failure resulted in crankcase explosion and one injury. Piston ring lands had disintegrated on one side of the piston; compression rings were stuck and broken. Blowby then ignited crankcase vapors.

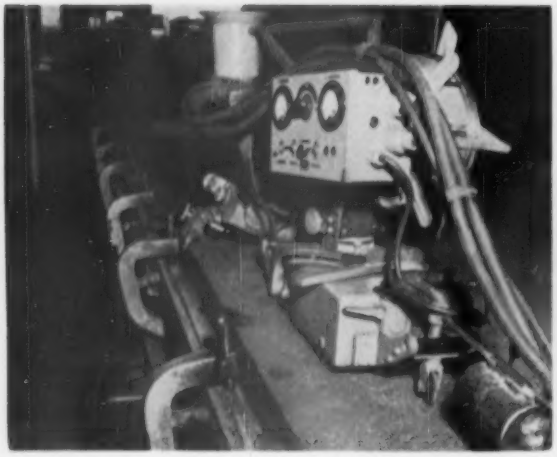
AMMETER explosion injured one when magnet stud working out of bracket caused short circuit. Glass was scattered over the cab resulting in injury.

Candidate for Reading, Pa., heavy repair shop, dismantling has already started on this 55-ton hopper due for new sides, floors and hoppers.

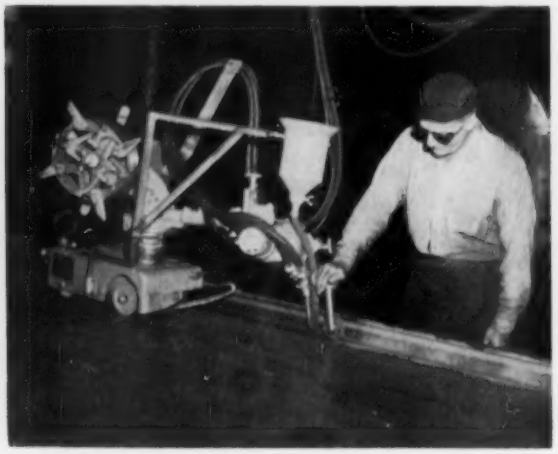
Cut-down removed sides, floors and hoppers, but left end sheets, floor supports, brake equipment, Duryea center sills, and trucks.

Reading Rebuilds Its Hoppers

Nearly a million pounds of sheet steel were saved during the rebuilding of 3,477 Reading hoppers. Steel consumption was cut because Unionmelt welding permitted the elimination of lap-joint construction in the car sides. A production line was set up at the Reading, Pa., car shop



Top side angle clamped in place is welded to the inside of the side sheet. End side sheets have already been Unionmelt butt welded to the side sheet prior to this operation.



Top side angle is welded along joint on the outside of the side sheet after the assembly has been turned over. At same time another Unionmelt machine welds bottom reinforcement.

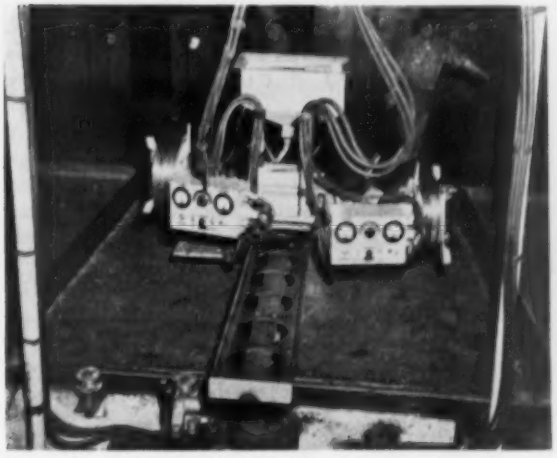
Ready for the road after painting and stencilling. Reading program has produced 3,477 of these rebuilt hopper cars.

on which a series of welding machines turned out the redesigned side assemblies.

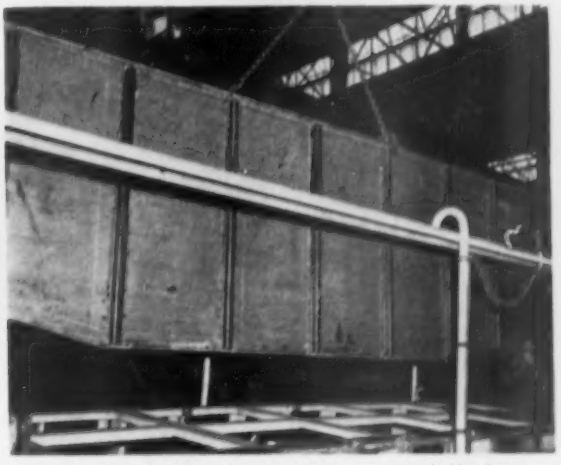
Material savings included the elimination of a 6-in. width of ¼-in. steel plate from each joint in the center and end side sheets—a reduction per car of 61 lb. Unionmelt welding also made it possible to reduce the amount of steel used in the flanged U-shaped side stakes. The width of ¼-in. material here was reduced from 12½-in. to 10¼-in.—a saving of 226 lb per car. In addition to material savings, the Unionmelt welding setups increased the speed of fabricating operations. Often two welds were run at one time at welding speeds up to 45 in. per minute.

While the new car sides were being built, the shopped cars were cut down with oxy-acetylene torches. Each car was reduced to the center sill, floor supports and end sheets. New welded sides and floor were installed. Trucks were completely reconditioned. The rebuilt cars were painted and stencilled, and then went back on the road for years of additional service.

Welded side assembly is brought up to car which has already been fitted with welded floors and hoppers. Welding has also permitted elimination of lap joints in floor.

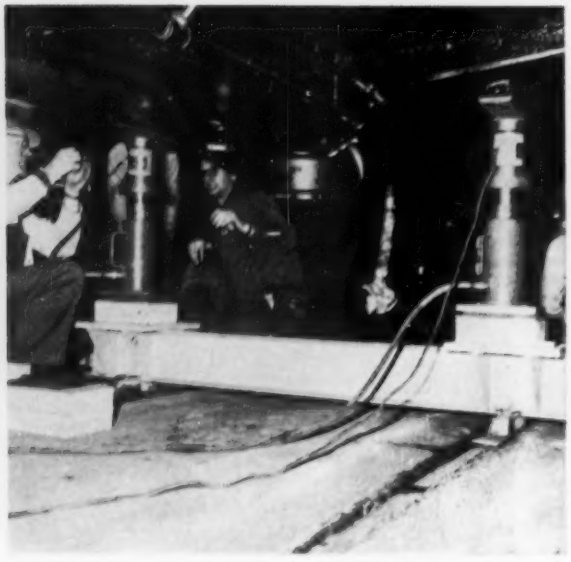


Side stakes are welded along both sides at the same time after they have been located and tack welded. Track assembly for the two welders is held down over the side stake.



Complete and ready for application to the car, welded side sheets are characterized by absence of lap joints and simpler side stakes both made possible with welding process.

One end of the car is placed on a ball seat (with adapter) while the other end rests on two load cells (right). The seat of the load cell has a leaded insert to enable it to conform to the surface of the lifting jack. The top of the cell has a 4-in. spherical radius, the bottom of the bearing block, or cap, a 5-in. spherical radius, a combination found to give the best rolling action.



Passenger Car Center of Gravity—

How To Determine It and Why

Weighing equipment required consists of: Ball Seat (1), Ball Seat Riser (2), King Pin Opening Guide Block (3), Two 50,000 lb capacity load cells (4), Load Cells Seats (5), Load Cell Bearing Blocks (6), and Strain Indicator (7).

The first question that naturally arises on determining the center of gravity of a passenger car is, "Why do it at all?" There are several good reasons. Among them are:

- To obtain proper spring load distribution in order to get the desired static deflection on all springs.
- To avoid overloading individual wheels or journals. While merely weighing each end of the car on track scales gives the total weight at rail for each truck, the determination of the center of gravity gives the weight distribution on each side.
- To know how much roll may be expected on curves at high speed, and what top speed may be safely allowed.

All of these considerations are becoming increasingly important in giving the passenger a good ride at high speed. Of course, the center of gravity (c.g.) location can be determined by laborious calculations, but a final check on the completed car is desirable. The space location of the c.g. of a car has now been simplified by rolling the car and utilizing Baldwin electronic load cells. The method was developed by W. E. Burdick, engineer of tests, General Steel Castings, with the suggestion to roll the car originated by E. H. Weston, assistant superintendent of motive power of the Chicago & North Western.

The method consists of supporting the car body on a ball joint engaged in the kingpin opening on one end with the other end of the car supported on load

cells resting on lifting jacks at the side bearings or jacking pads. With the car body thus supported on the three points, plumb lines are dropped at either end, between the collision posts, to establish a vertical plane of reference. Lined targets are placed under the plumb bobs.

The car is first brought to level position by checking the plumb lines, and the weights on the load cells are read on a strain indicator. The load cells are calibrated so that one micro-inch of strain read on the indicator is equivalent to $12\frac{1}{3}$ lb load.

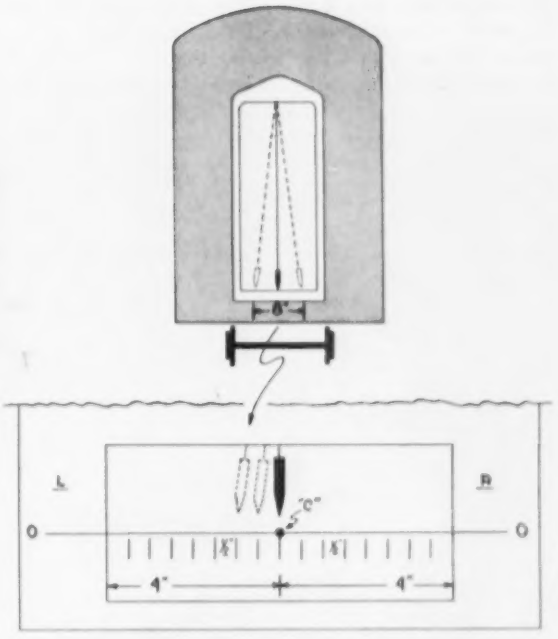
The car is rolled first to the left and then to the right by raising one jack and lowering the other, keeping the longitudinal centerline level. Readings of the weight on each load cell are taken each time the car is tipped enough for the bob to travel about ½ inch. This procedure is continued until the bob has moved a total distance of 4 in. to the left.

The jack on the left is then raised, and the right one lowered and ½ in. increment readings continued until the bob has moved back through center point *C* and on to 4 in. to the right. Movement of the jacks is again reversed until the car is leveled with the plumb bob over *C*. All of the load cell and plumb bob readings are tabulated.

The tabulated readings are extended to show, first, the difference between right and left load cells, and secondly, their sum. The difference is plotted against the plumb bob readings as shown on the attached graph. A hysteresis loop results due to the frictional drag of the supports opposing the rolling action. The mid-axis of this loop represents the true value of the load shift as the car is rolled. The angle of roll is of course the travel of the plumb bob divided by the plumb line length.

Three significant intersection points are taken from the graph—the load difference with the car level, and with the car tilted 4 in. to the left and 4 in. to the right. These points are used in the later calculations. For convenience the values are carried as micro-inches in the tabulations and graphs and finally converted to pounds by multiplying by 12.5.

After one end of the car is thus weighed, the operation is repeated at the other end.



As the plumb bob hangs in a true vertical line it naturally moves relative to the car floor as the car is tilted (top). During the procedure, the car body is tilted enough to either side of level that the bob travels 4 in. either way from the mid-point (center). Readings are taken on both load cells each time the car is tilted enough to advance the travel of the plumb bob another ½ in. in the direction desired, as shown in the bottom view which is an enlarged view of the target over which the plumb bob swings. With care the plumb bob may be read to .02 in. to be consistent with the accuracy of the load cells which are within 125 lb.

Calculations Not Complicated

Weight and c.g. of the car body are determined as follows:

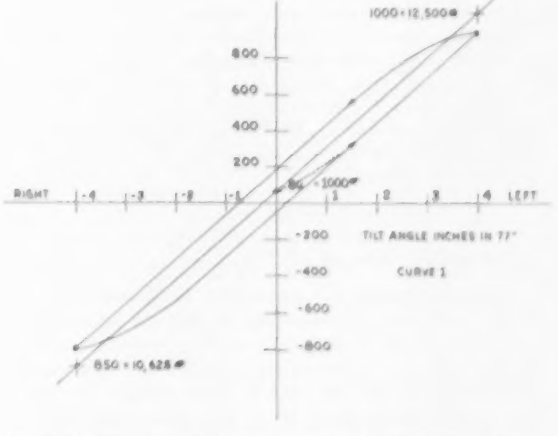
1. Average of the sum of the load cell weights at each end represents the weight carried by that truck.

2. The longitudinal location of the c.g. from the end $X = \frac{W_B}{W} m$ where W_B is weight on B truck, W is total weight of car body, and m is distance between truck centers.

3. The transverse location of the c.g. from the centerline, $Y = \frac{W_L - W_R}{W} n$ where $W_L - W_R$ is the difference between left and right loads, with car level, as taken from the graph, and n is half the transverse distance between load cells. From calculations for each end, a cross check of the accuracy of the operation is obtained.

4. The vertical location of the c.g. is determined by obtaining the total transference of load from the graph, as the car is tilted from the extreme right to left positions.

The greater the load transference, the higher is the center of gravity from the axis of rotation. As the car is rolled it is constrained to rotate about an axis.



Plot of the differences of the left and right side load cell readings on the A end. By using the axis of the hysterisis loop that results, the errors that would otherwise be introduced by frictional resistance are effectively eliminated.

One end of this axis is the center of the ball seat and the other is the intersection of the longitudinal centerline of the car with a line joining the radius centers of the load cell bearing surfaces. The c.g. height above the axis of rotation is $Z = \frac{T\,n\,l}{W\,d}$ where:

T = total load transference

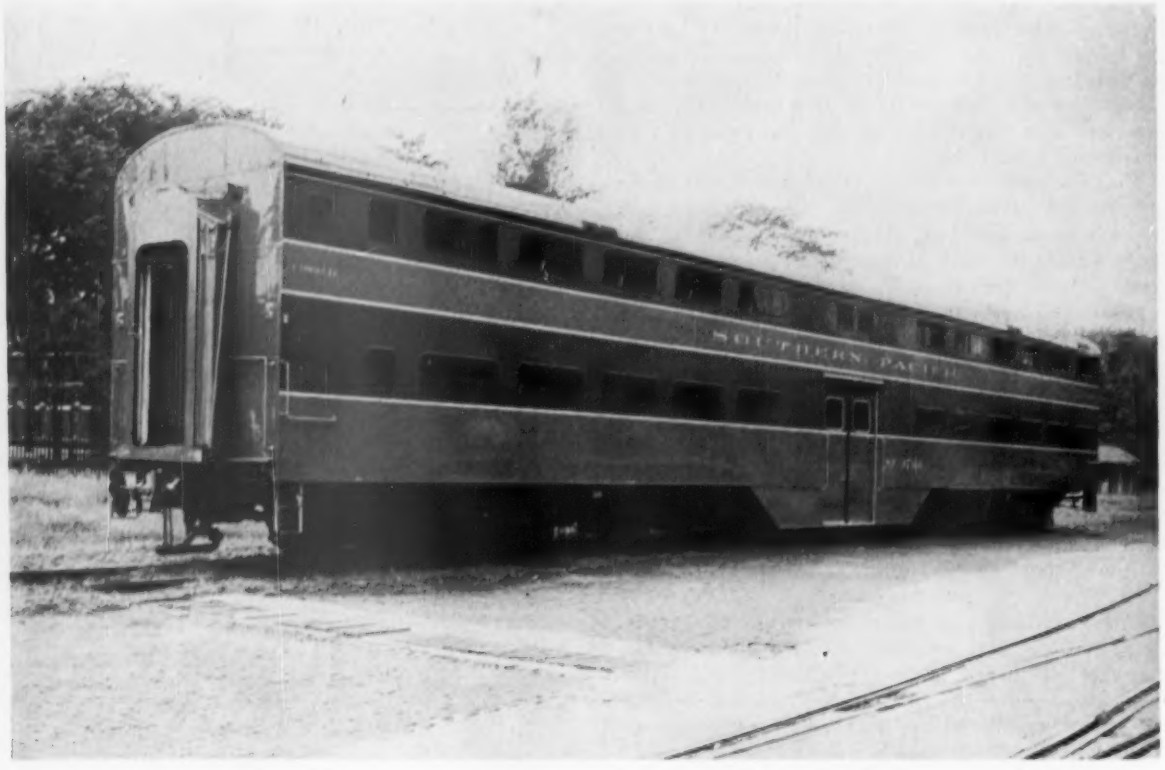
n = ½ transverse centers of load cells

l = length of plumb line

W = total weight of car body

d = total plumb line travel to produce T

Adding the height of the axis of rotation above the rail to Z tells how high the c.g. is above the rail. The accompanying box shows a sample set of calculations for locating the c.g. in the three different planes.



GALLERY CAR CENTER OF GRAVITY

The recently delivered gallery suburban cars for both the C&NW and SP were weighed and the center of gravity determined as outlined in this article. The graph of weight differences shown was obtained from one of the SP cars. (The tables of individual weight readings on each side, from which the figures were obtained, is not shown). To illustrate the method, the following calculations are shown for this car based on the data obtained:

Truck centers = 714 in. = m
½ cross centers of load cells = 29 in. = n
Plumb line length = 77 in. = l

Loads cells under side bearings on truck centerline. Ball seat in king pin opening of opposite truck.

Weight of car body at A End, $W_A = 4152 \times 12.5 = 51900\#$
Weight of car body at B End, $W_B = 4308 \times 12.5 = 53850\#$
Total weight of car body, W = 105750#

Car weighed at	"A" End	"B" End
Difference, car level, (see Graph)	1000#	625#
Average, $W_L - W_R$		812#
Car tilted 4 in. in 77 in. to left	12500#	12125#
Car tilted 4 in. in 77 in. to right	10625	10875
	23125	23000
Average, T	23062#	

Center of gravity location:

Longitudinally, $X = \frac{W_R}{W} m = \frac{53850}{105750} \times 714 = 363.58$ in.
(From "A" end)

Transversely, $Y = \frac{W_L - W_R}{W} n = \frac{812 \times 29}{105750} = 0.222$ in.
(Left of centerline)

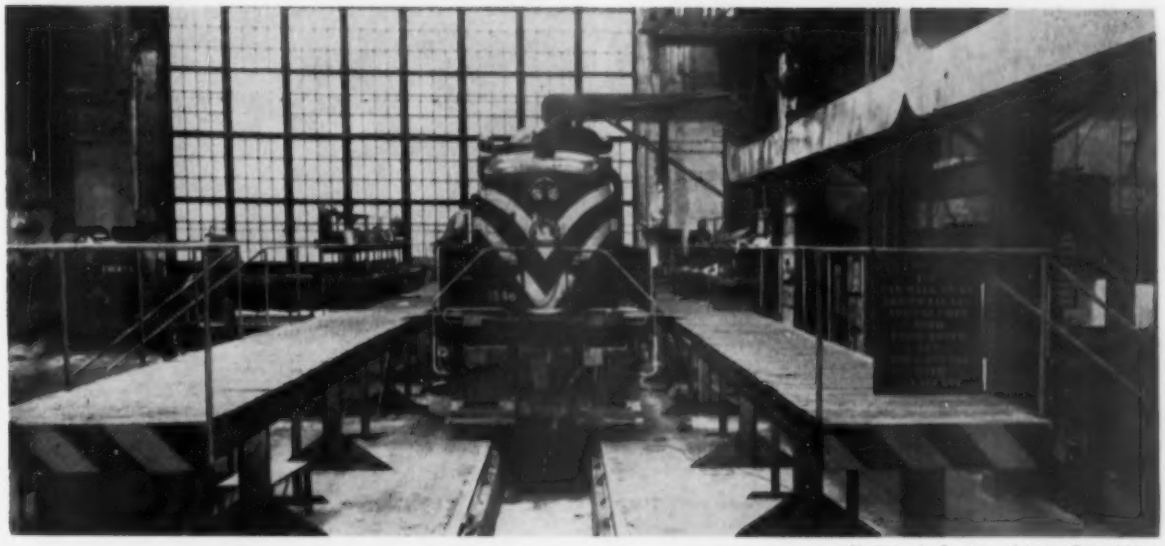
Vertically, $Z = \frac{T\,n\,l}{Wd} = \frac{23062 \times 29 \times 77}{105750 \times 8} = 60.87$ in.
(Above axis of rotation)

Axis of rotation above rail = 22.19 in.
Center of gravity above rail = 83.06 in.

This car was also weighed at each end on track scales as a double check. Deducting the actual weight of trucks gave the following comparison:

	A End	B End	Total
Weighed on load cells	51900	53850	105750
Weighed on track scales	51650	54100	105750

At Bethlehem Shop . . .



Photographs Courtesy of Jersey Central Lines

CNJ Cleans Them Cold

Engines, oil coolers and other diesel components are cleaned with unheated cleaning solutions

by F. A. SCHNITZLER
Oakite Products, Inc.

Now the Jersey Central is handling all maintenance cleaning at its Bethlehem, Pa. enginehouse without benefit of heated solutions.

Many railroads clean diesel engine lube oil coolers once a year. The Jersey Central however, does the job every six months. The wisdom of this semi-annual cleaning may be seen from the following figures. A cooler that had been in service for some time was cleaned initially in July, 1953. It was weighed prior to and immediately after cleaning. After cleaning it weighed 35 lb less than before. Six months later, in January, 1954, the same cooler was weighed, cleaned again and reweighed. The differential this time, after only six months, was 12 lb. Twice more, at six months intervals, July, 1954 and January, 1955, this unit was cleaned. Always it was weighed before and after cleaning, with an appreciable difference in weight being recorded each time.

Aside from the fact that cleaning lube oil coolers every six months means they'll work better, this road has a method for doing the job that makes it practical to tackle the work that often. The coolers are not removed from the engine and dismantled but are cleaned in place.

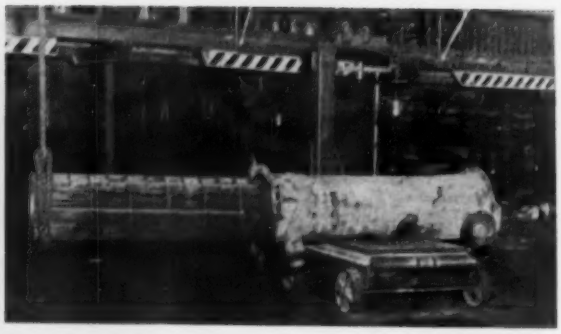
The procedure for such cleaning is as follows: The shop has a 275-gallon capacity solution tank, an Alco water pump driven by a 7½ hp motor operating at 1,720 rpm and a supply of solution hose and piping. The pump and tank are mounted on dollies for mobility. In the solution tank they prepare a solvent detergent solution of one part Oakite Composition No. 11 to four parts kerosene. (Oakite No. 11 is especially formulated to remove carbon deposits at room temperature.) Then it is necessary to make the necessary connections for circulating the solution through the cooler at room temperature for between four and six hours. The flow is reversed intermittently.

The cooler is rinsed with water circulated one hour, intermittently reversing flow as with the detergent solution. The detergent reclaimed from the cooler is saved and used to clean other coolers, each tankful of solution being effective for a total of six coolers. Even after the sixth cooler, the solution is not discarded but is stored in steel drums for use in cleaning miscellaneous parts.

The foregoing procedure is comparatively simple, particularly when compared with what is involved to take down the coolers for cleaning. The latter way they first have to be removed from the engine, then disassembled, cleaned, reassembled and replaced in the locomotive. Removing, dismantling and replacing a cooler keeps two pipe fitters busy sixteen hours, or a total of thirty-two man-hours for the job. A crane operator must also be called on for the lifting of the cooler in and out of the engine.

If the job had to be done this way, instead of the easy

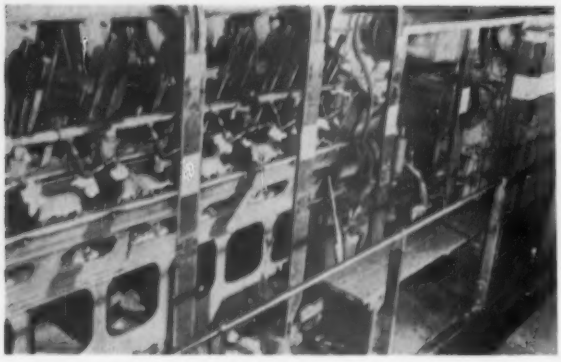
CNJ Lubricating Oil Coolers . . .



Removal checked efficiency of in-place cleaning of this oil cooler. Coolers usually weigh 12-lb less after each semi-annual cleaning.

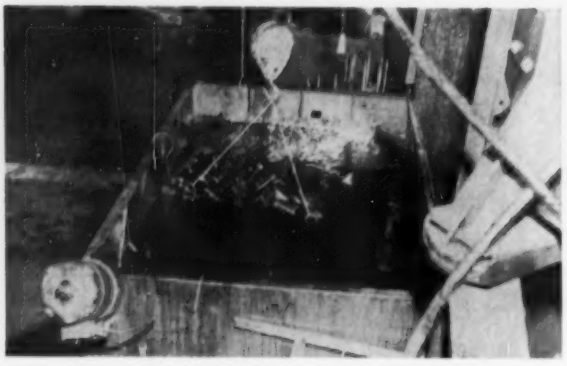
◀ Lube oil cooler cleaned in place on Jersey Central road switcher is an easy operation and the road now does each locomotive twice yearly.

Crankcases . . .



Crankcase is cleaned externally prior to power assembly removal. After liners and pistons are out, the interior is also cleaned.

Engine Parts . . .



Valve springs and other components are cleaned in tank with used solution. In foreground is agitator for moving the solution in the tank.

Filters . . .

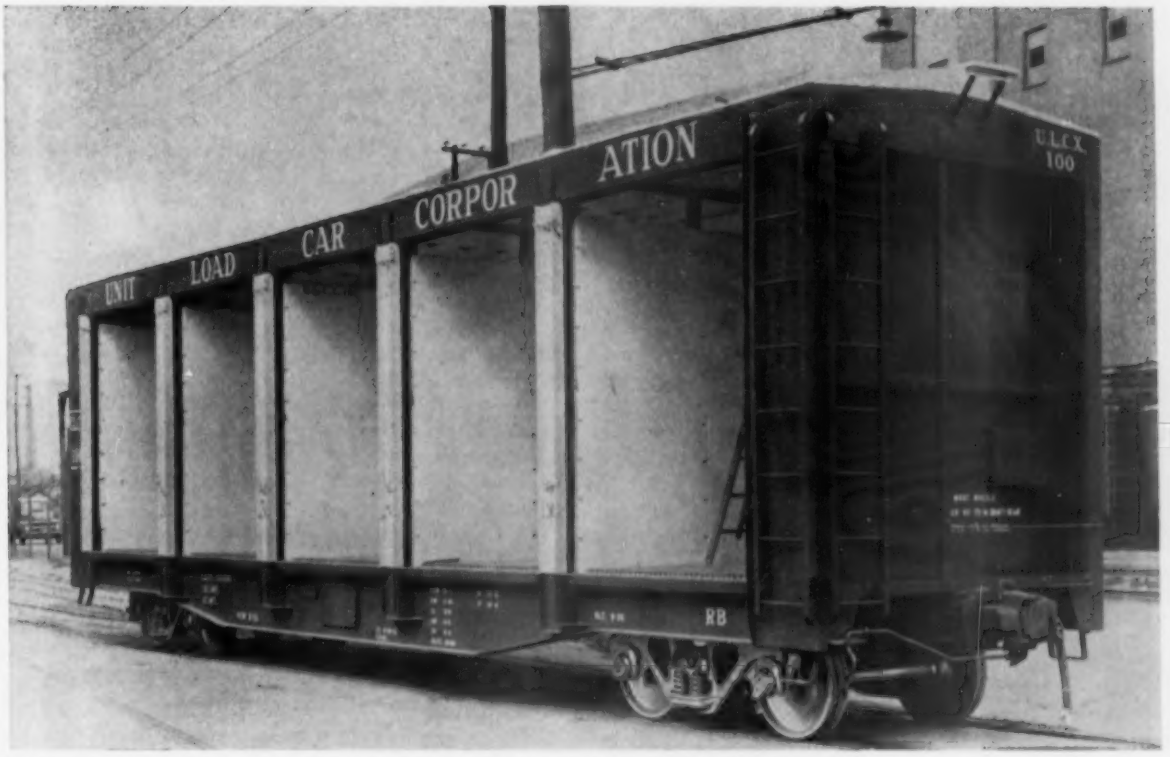
Filters are cleaned in the same tank as engine components and an Oakite rinsing unit is being used here to flush away the cleaning solution.

in-place way, it is not likely that coolers would be cleaned every six months, in spite of the proved advantage of this regular maintenance attention. In addition to the saving in man hours and money a more thorough cleaning job results, making possible lower operating temperatures.

So that mechanical repairs can be accomplished more effectively the complete engine block is cleaned by spraying it with a solution of Oakite No. 11 and kerosene. An Oakite Sprayer, Model No. 374, is used to apply the solution to the block, after which it is given an air and water rinse, using the Oakite Rinse Master.

After this cleaning the cylinder assemblies are removed. The mechanics who do this work feel that the clean block enables them to save time on tear-down. Once the cylinder assemblies are out the interior of the block is cleaned by spraying a detergent solution through the air box openings. In addition to the air box areas the cylinder walls and crankcase are cleaned. Removing the plug in the crankcase lets the cleaning solution drain off. Then the air-water rinse is applied.

It would be impossible to do this exterior and interior block cleaning manually. Only the exposed areas could be covered and some of these would certainly be missed.



Dividing the load into five compartments cuts loading costs substantially and reduces impact forces by 80% in this . . .

New Approach to Box Car Design

Something entirely new in the way of a box car may soon be making its appearance in quantity if tests with an experimental unit prove successful. Primary feature of the car is the rapidity with which it can be loaded and unloaded because it is divided into five interior compartments. Either of these operations can be completed in about ten minutes depending on how many lift trucks are used (up to five can be used at one time), and how near the lading is to the car.

A second and perhaps equally important feature of the car is its ability to reduce damage to lading in two ways:

- As the load can shift only a small distance it does not attain much speed before coming into contact with the bulkhead, thereby reducing the impact substantially.
- Because the load is divided into five groups, the force acting upon the edge of the load that bumps the bulkhead is only one-fifth as great as if the entire contents of the car rammed against one end.

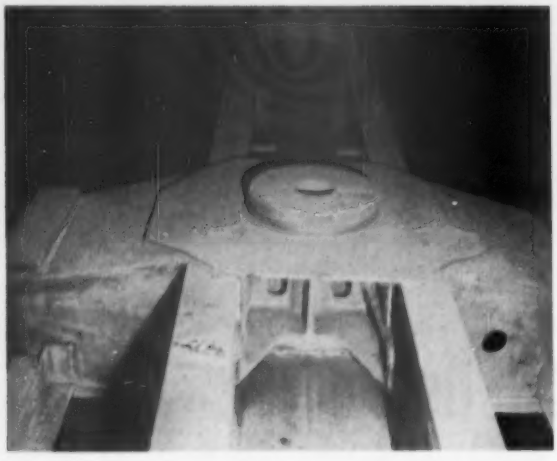
As additional protection against switching or road impacts the car also has a new draft gear with a 36-in. pocket developed by W. H. Miner, Inc. Known as the RF75-M, the gear has 4½-in. travel in place of the usual 2½ in. It is capable of absorbing 75,000 ft-lb of impact energy, which compares to about 28,000 for a friction gear and 38,000 for a combination friction and rubber gear. ASF Type E high-tensile Style S-471 couplers and Pattern 17691 high tensile yokes are also used. The overall draft arrangement was specifically authorized by the mechanical division of the AAR.

Further protection for lading is provided in 48 banding anchors per compartment—24 distributed over the face of each bulkhead—for odd sized loads or for loads that are felt to require extra securing.

The car has ten overhead garage-type doors, five to each side. These doors provide a 7½ ft by 9¼ ft opening into either side of five compartments. These five interior compartments are formed with permanent bulkheads and each has a floor area of 69 sq ft.

These compartments and the pallets designed to be used within them are sized so that four palletized loads fit snugly within each space. Standard 48 in. by 40 in. pallets are used, and the lift truck can go straight in and out without maneuvering. The compartment itself is 7½ ft by 9 ft.

Overhead garage doors, which weigh but 147 lb each, including all hardware, permit a 9 ft 3 in. clear height. The doors are flush on the inside so that lading does not jam against them and make opening difficult. While each compartment can be entered from either side, the door on only one side can be open at a time as both roll up on the same overhead track.



One-piece steel casting incorporates the center plate, the bolster center filler and the rear draft lugs (above). Besides being stronger than the usual three-piece riveted construction, this design gives a more accurate center plate height and fits the center sill better because all clearances are filled up when it is welded in place (below).

All insulation is of sandwich construction with a "Styrofoam" core. All joints in the insulation are overlapping tongue-and-groove, bonded with a specially formulated epoxy-type adhesive. Exposed surfaces of the header and ceiling panels are faced with Fiberglas cloth polyester. So are half of the bulkhead panels. The other half have 20-gage steel and are painted.

The floor construction, from the bottom up, comprises a 1/16-in. steel coated underside, with a rubber-base undersealer, then a sandwich panel of ¼ in. exterior grade plywood on the bottom, 3-in. expanded "Styrofoam" in the center and topped by ½-in. exterior grade plywood covered with ⅛ in. steel, and finally extruded aluminum dry lading flooring. Each door has seven panels of sandwich construction with the center made of expanded Styrofoam 1¾ in. thick. It is faced on either side with ⅛-in. hardwood plywood which is protected from the weather and other damage by Fiberglas impregnated with a special plastic. All edges are inlaid with the Fiberglas cloth polyester. Special Neoprene gaskets seal the hinged space between the seven panels as well as around the bottom and tops of the door and along both sides.

Expanded Styrofoam is also used in the ceiling, the floor insulation, the bulkheads and the ends. In the ceiling, the foam is sandwiched between the steel car skin and plywood covered with plastic-impregnated Fiberglas.

Clamps spot-welded to the ceiling contain a special adhesive to secure the foam in place. The bulkheads and ends have a Styrofoam-plywood sandwich with the sandwich attached to a steel framework by an adhesive.

The four bulkheads which divide the interior of the car into five compartments have 9-in. walls. The main structural members of the walls are 9-in. channels, which serve also to carry the door track in a recess between the channel and the wall. These walls, or bulkheads, carry lading forces only. The overall structure exceeds AAR requirements for withstanding external forces without taking the strength added by the bulkheads into consideration.

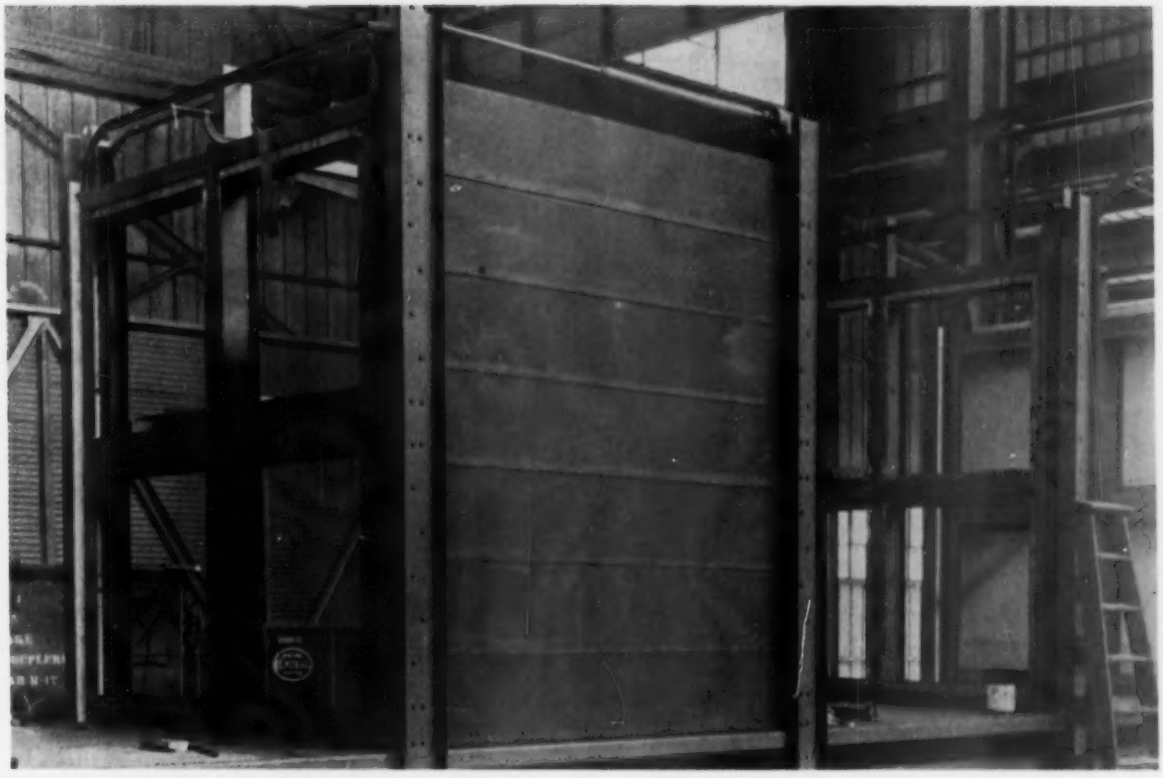
This feature (a large concentration of strength in the underframe to withstand train shock and buffing forces) answers another purpose. It permits the underframe and the body to be considered as two separate units. The underframe is intended to be long-lived and is built sturdy to stand up under the operation of the long fast trains of today and the future. At the same time the superstructure can be designed to fit current needs and yet be modified or changed to keep pace with the changing requirements of transportation. It is an attempt to make it practical to depreciate freight cars on the basis of obsolescence instead of age—an objective in line with the rapid technical progress which makes today's conceptions obsolete in much less than the 25 years or more which is now the basic factor in rolling stock depreciation.

Features of the Structure

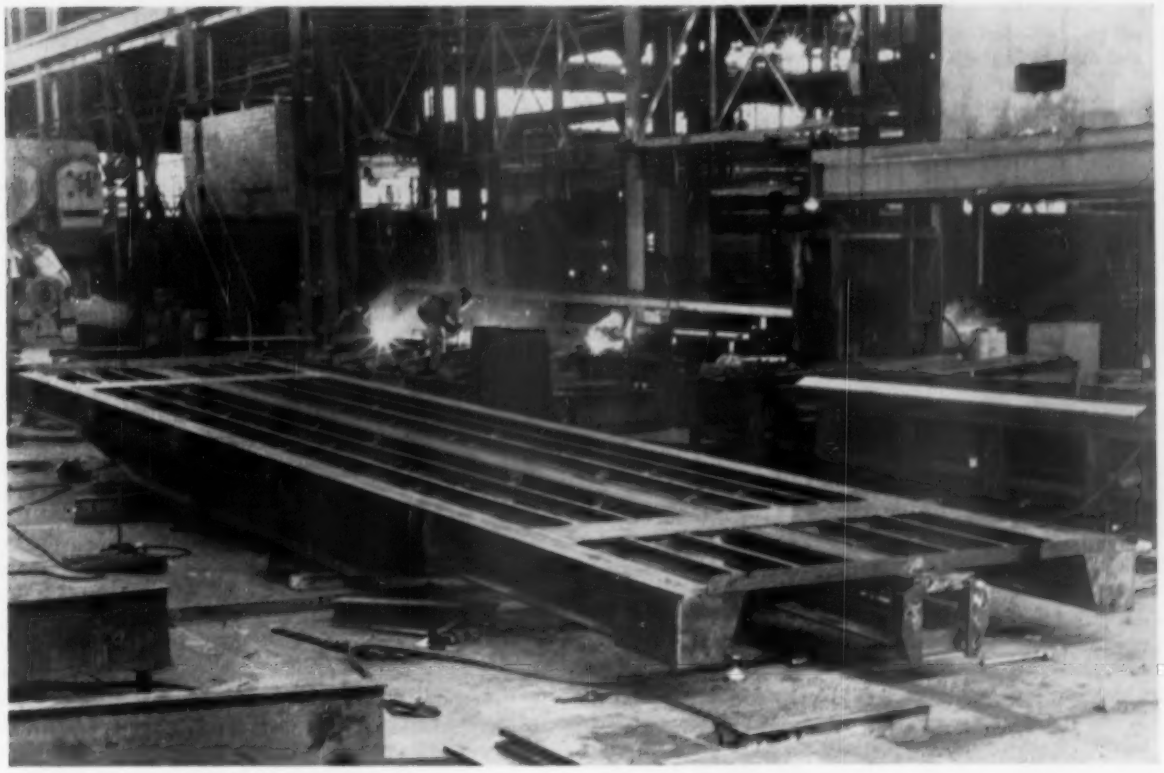
The unusual design of these cars has been termed a "diagonal-less truss" by the Railway Division of International Steel Co., Evansville, Ind., the designer and builder of the cars. In general the side sills carry the vertically imposed load while the center sill takes the horizontal loads. The center sill is a standard 41.2 lb AAR Z-section, while the side sills are a 24-in. wide flange I-beam of Tri-Ten alloy. The latter are of fish-belly design to give added strength toward the center of the car to take care of the naturally greater load in that area. A double flange plate forms the cornerpost "shear brace" at each of the four corners.

An interesting feature of the car, which is equally adaptable to conventional equipment, is International Steel's one-piece steel casting incorporating the center plate, the bolster center filler and the rear draft lugs. This design is stronger than the typical three-piece riveted contruction. It also gives a more accurate center plate height, eliminates broken center plates and fits the center sill better because all clearances are filled up when it is welded in place.

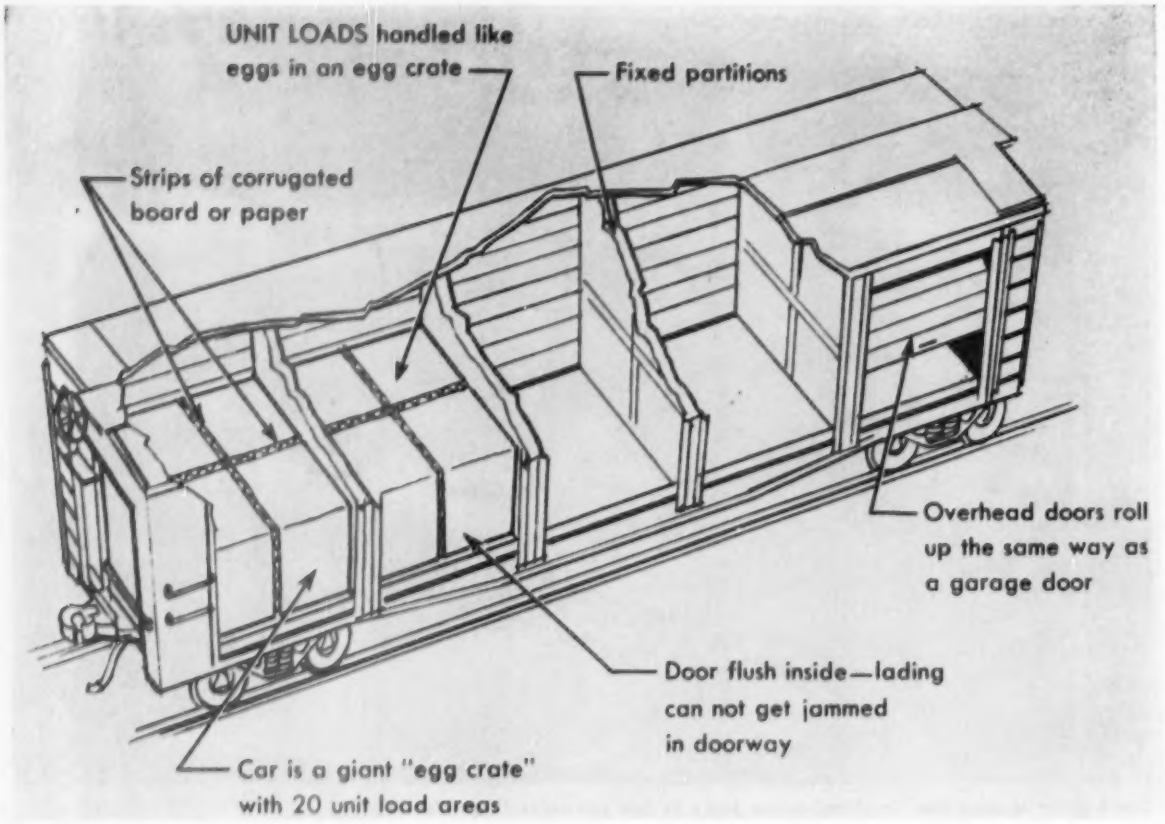
While this car has many features that border on the revolutionary, the design uses AAR standard components wherever possible, including ASF A-3 Ride Control pedestal-type trucks with 3 11/16-in. travel springs, Timken heavy-duty roller bearings, one-wear steel



Door construction shows how the channel-section tracks fit into a recess in the partition walls.



Massive underframe is foundation to structural design that exceeds AAR requirements without taking into consideration the additional strength provided by the 9-in. interior partitions.


UNIT LOADS handled like eggs in an egg crate
Fixed partitions
Strips of corrugated board or paper
Overhead doors roll up the same way as a garage door
Door flush inside—lading can not get jammed in doorway
Car is a giant "egg crate" with 20 unit load areas

Features of the car that make for rapid loading, greatly reduced damage to lading and easy operation.

wheels, cast steel unit brake beams, roller side bearings, and automatic slack adjusters.

The nominal capacity of the car is 55 tons and 3,360 cu ft. Lightweight is 58,300 lb and the load limit is 110,700. Coupled length of the car is 48 ft 5¾ in. Height and width dimensions (10 ft 2 in. and 15 ft 1 in.) conform to all AAR clearance requirements.

3,000 Cars May Enter Service

If the car shows up well in service tests—which are already under way—the Unit Load Car Corporation will place an initial order for 3,000. The corporation hopes to acquire government approval for fast amortization of the order, at which production the cost per car is estimated at $12,500.

Unit-Load will lease or sell these cars, which are classified as an RB type (similar to refrigerator car without ice bunkers). As such, it will carry a rate of 3.5 cents per mile. Pallets will come back in the car at no additional cost as the car is operated under lease at a mileage rate. In fact, the pallets are considered as the floor of the car.

Development of the "Unit Load" car grew from the necessity of modifying railroad rolling stock to fit into and accommodate the mechanized handling of goods which has progressed so rapidly and extended so far in industry in a relatively short period. While standardization of palletized or unitized load dimensions has so far been achieved in a limited way only and it does not appear practical to standardize on one size for all materials, standardization in practical multiples offers wide applicability to different products.

This "edition" of the "Unit Load" conception of transportation vehicle was developed for and around the food and allied industries. In this development the first "target" was to make all stowage space of ready access in minimum time. Other objectives met include the minimization of loose dunnage or adjustable gates, and retainment of the lading in the relative stowed position. All are attained by the fixed intermediate bulkheads and the tailoring of the compartment size to fit the dimensions of the lading components as unitized.

Initial user of this type car is the Calumet Industrial District Company, a huge food warehouse firm, which developed a system of palletized handling of packaged foodstuffs. This company provides manufacturers with wooden pallets on which packages are placed and remain from factory to a central warehouse to the ultimate retailer.

Because this type of volume operation lends itself to mechanized handling at all points, cutting per-ton handling costs as much as 90 per cent, and because it permits economical transportation in much smaller quantities, this new concept could make the railroads competitive for large volumes of food business now going by truck. Furthermore, while the Unit Load car was initially developed around the practices and requirements of the vast food and allied industries, but minor modifications would be needed to the superstructure to make it "fit" other materials, goods, products, components or assemblies—in short anything handled in pieces or packages.

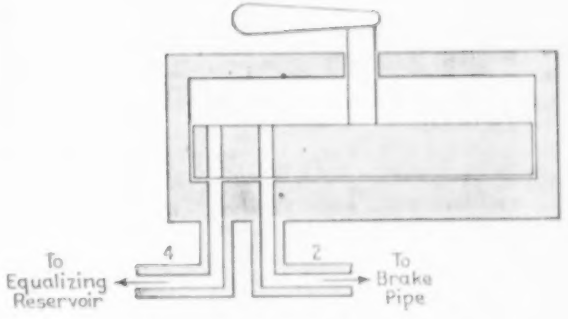
24-RL Brake Valve

The intent of this series is to present a simple schematic study of air brake starting with the 24-RL brake equipment for locomotives. To assist the reader, a copy of Instruction Leaflet No. 2606-1 may be obtained free by applying to the nearest Westinghouse Air Brake Company branch office.

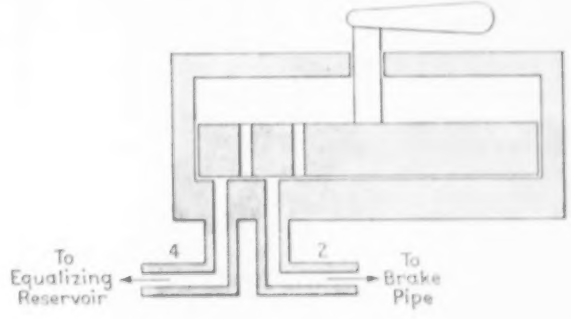
The use of colors has long been recognized as a valuable aid in the field of visual education. This is especially true in the study of air brake because of the great number of pipes, ports and passages which connect and cross one another.

An attempt to trace air flow through the various components in their numerous positions without the aid of colors to represent different pressures and circuits will generally lead to confusion and result in considerable loss of time.

It has been found that diagrammatic drawings like those in the 24-RL leaflet can easily be interpreted with the color system after the reader has learned the meaning of the colors he has used. Such simple schematic sketches in color can be read at a glance after some practice and will need very little additional explanation. In order to properly convey the story of what is taking place, it is necessary to know exactly where one color (circuit) stops and where another begins. To avoid confusion with the Plate and Figure Numbers appearing in the Leaflets, other drawings will be referred to as Sketches.



SKETCH 1—Running Position



SKETCH 2—Lap Position

Schematic Drawings

Sketches 1 and 2 represent crude schematics of an automatic brake valve's rotary valve and seat. Note that there is no attempt to make these sketches into realistic drawings. Simple block or box figures will answer the purpose.

Sketch 1 represents the brake valve in running position. Assume that feed valve pressure is orange, brake pipe is yellow, and equalizing reservoir is light green. Color the entire space above the rotary valve with orange (feed valve) and bring this same color down through the rotary valve to the dividing line between rotary valve and seat. Stop here because this will be the point of cut-off when the rotary valve moves on its seat. With a light green pencil color the passage connection 4 leading to the equalizing reservoir and start where the orange color stopped at the point of cut-off. With the yellow color starting from the point of cut-off, color the passage to the brake pipe. An arrow can be used here and there to indicate the direction of air flow. The story indicated by the colors is that in running position feed valve pressure flows through the automatic brake valve's rotary valve to the brake pipe and equalizing reservoir. There are other connections, but this is only an example to show the meaning of the colors. Knowing the color scheme, the flow of air can be read at a glance.

Assume that the brake valve handle has been moved so that the rotary valve is in lap position in Sketch 2. With orange pencil, color the space above the rotary valve and continue the same color down through the connecting passages, stopping at the top of the rotary valve seat. Moving the rotary valve has cut off communication with the ports in the seat.

Now assuming that there is still pressure within the brake pipe and equalizing reservoir, color the passages leading to the brake pipe and reservoir yellow and light green respectively. Start at the dividing line between the rotary valve and seat. There should be no arrows in this sketch because there is no flow of air.

Recommended Colors

Many colored pencils will rub off or smear, and are not satisfactory. Mongol type indelible pencils have been very satisfactory. When using them, fill in the space between the lines.

Do not use this type of indelible pencil for numbers or notations on drawings. When the space has been filled with the color, dampen a small artist's brush with water, moisten the colored area, and let it dry. This sets the color so that it will not rub off. Be sure that the brush is not too

wet. With a little practice, this is easy. Do not work back over any space until it has dried—this takes a few minutes.

Rotary Valve Connections

Sketch 3 is a chart of the automatic brake valve rotary connections for 24-RL brake equipment. When colored, it is handy for reference to determine what connections are made in the various positions of the brake valve handle.

Release Position, Sketch 3a. Color in orange the block at the left, starting at 21 which is the number of the feed valve passage to the rotary valve in the Westinghouse leaflet.

Stop the orange color at the point where passages 2 and 4 connect with this block. Color passage 2 to the brake pipe in yellow and passage 4 to the equalizing reservoir in light green. When finished, the colors show that feed valve air flows to the brake pipe and equalizing reservoir. No written explanation is required if you know the colors.

Next note that passages 43 and 32 are connected through the rotary valve. Because passage 43 is connected to brake pipe passage 2 through the selector cock, passages 43 and 32 should be colored in yellow included also the connection in the rotary valve. Passage 32 leads to the feed valve control chamber and so this places brake pipe air against the feed valve diaphragm.

Passage 30 from the main reservoir connects to passage marked WP (Warning Port) and passage 29 which leads to the connection at the brake valve bracket for the compressor governor, if used. With the carmine pencil, color the three connections and their connecting cavity in the rotary valve. Connections shown in the upper right hand corner of Sketch 3a are passages 8a, 26, 33, and 18a. These are connected to the exhaust and to the atmosphere. Since the color chart shows that no color is to be used for the atmosphere, this area requires no coloring. The release position of the automatic brake valve rotary valve is completed.

Running Position, Sketch 3b. Start at passage 21 and color in orange the entire block and carry this color through to include passages 22, 14 and 19. Do not use the orange in passages 2 or 4. Passage 2 must be in yellow and passage 4 in light green as they have been previously. The color scheme shows that feed valve air is flowing as follows: into passage 22 to pipe 23 and to the rotair valve; into passage 14 through the first service cock to the maintaining valve; into passage 19 to the suppression reservoir at the suppression valve if train control is used; into passages 2 and 4 to the brake pipe and equalizing reservoir, respectively. The connection between 2a and 32 in Sketch 3b should be colored in yellow to show brake pipe air flowing to feed valve control chamber. Passages 30 and 29 must be colored in carmine. The passages connected to the exhaust are again left clear as in the release position in Sketch 3a.

First Service Position, Sketch 3c. Color in orange the feed valve block from passage 21 into passage 32 to the feed valve control chamber and into passage 14 to the maintaining valve. Passage 4 from the equalizing reservoir feeds through a choke to passage 24a and into pipe 24 to the reduction limiting reservoir. Color passage 4 to the choke in light green and from the choke into and including passage 24a in dark green. At the upper right show in yellow dashes a connection between passage 16 and exhaust which indicates that brake pipe is reducing in first service position. Passage 22 from pipe 23 and the first suppression reservoir through the rotair valve (in FRGT position) should be colored in orange to about half way through the cavity in the rotary valve and from there gray should be used into and including passage 26 (suppression).

Service Lap Position, Sketch 3d. Color in orange the feed valve block and passage 21. Passage 32 to the feed valve control chamber should also be orange. Passage 15 which is connected to passage 16 and the brake pipe exhaust outside the rotary valve also connects through a passage in the rotary valve to suppression passage 17. Color these completely in gray. Brake pipe passage 2 connects with passage 14 to the maintaining valve and should be in yellow. Passage 16, the brake pipe exhaust, is still connected and should be shown in yellow dashes on the sketch.

Service Position, Sketch 3e. Color in orange passage 21 and the feed valve block including passage 32 as in the service lap position. Color in gray the connections 15 and 17 again. Passage 2 from the brake pipe is shown connected to passage 14 to the maintaining valve and to suppression passage 26. Color in yellow passage 2, the cavity in the rotary valve, and passage 14. From the point where passage 26 joins the cavity, color in gray. At the upper right, show in light green dashes the connection from the equalizing reservoir, passage 4, to the exhaust. In addition, show in yellow dashes the connection from the brake pipe exhaust, passage 16, to the exhaust. This indicates that both the equalizing reservoir and brake pipe are exhausting to atmosphere in automatic service position.

Emergency Position, Sketch 3f. With orange color passage 21 and the feed valve block carrying the color into passage 32 to the feed valve control chamber and into passage 12 leading to pipe 12 and the power-knock-out switch, if used, or on electric locomotives when the D-24 brake valve is used with No. 8 brake equipment, pipe 12 serves as a maintenance feature during brake valve emergency.

Brake Valve Pipe Connections

Sketch 4 represents an enlarged view of the upper left hand corner of Fig 23 in WABCO Instruction Leaflet 2606-1. In order to more quickly interpret the brake valve pipe connections, it is suggested that they be shown in color. The inner circle will, when colored, be sufficient to show the needed information. Accompanying Sketch 4 is a guide for applying the proper colors.

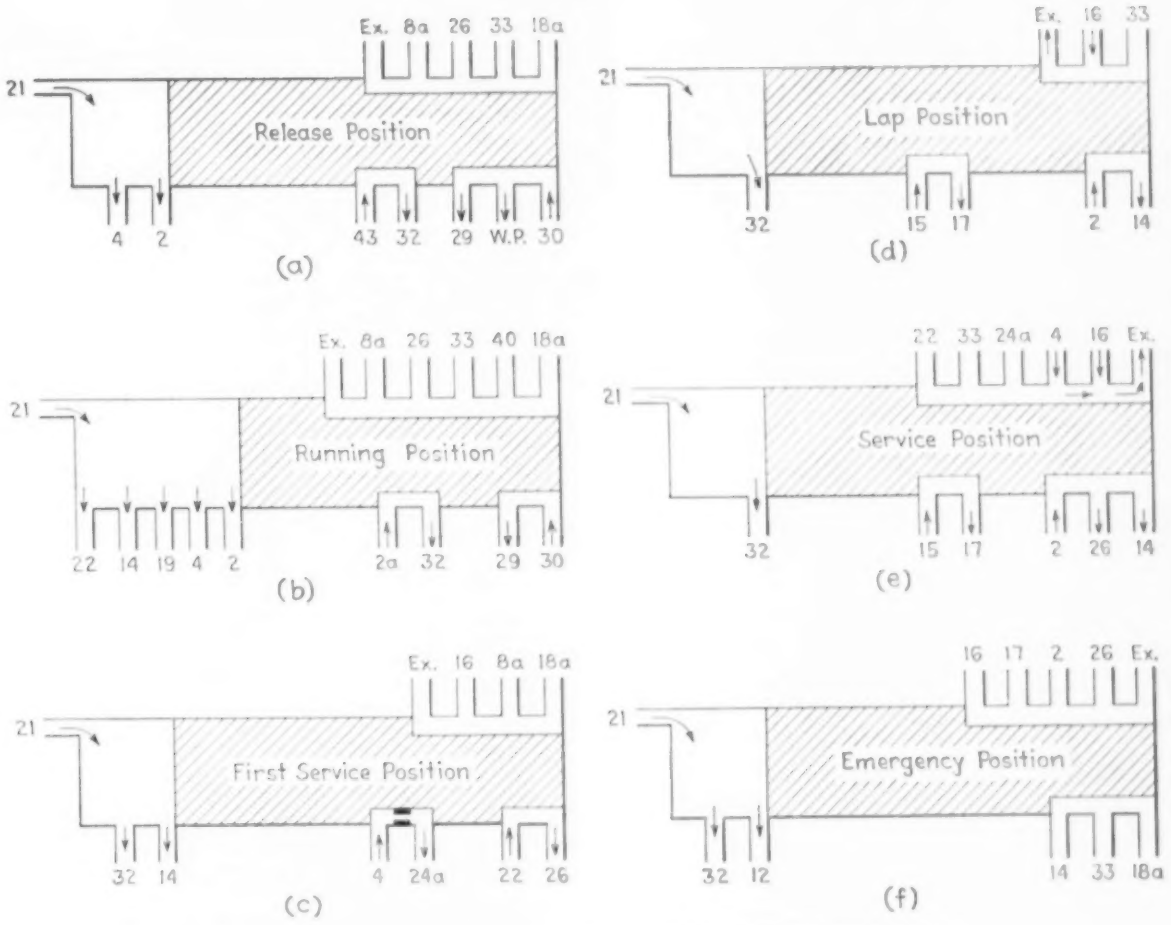
Color Chart

A color chart is shown indicating a color scheme for the numerous pressures used in various types of air brake equipment including the control air pressure on diesels. Other colors could be used, but the colors shown on this chart will be used in this series. It is suggested if a great amount of coloring is planned, that a large color chart be made and hung in a convenient spot for reference. The blocks on the chart can be filled in with the Mongol pencils numbered as shown. Dampen the spaces to set the colors afterward.

Note that brown is mentioned in two shades—light and dark. This can be done with the same pencil by varying the pressure on the point.

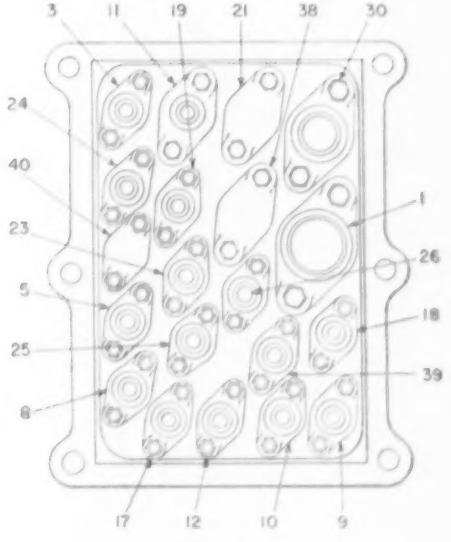
24-RL Rotary Valve Positions

SKETCH 3



Brake Valve Pipe Connections

Connection	Color	Pipe
1	Yellow	Brake
2	Carmine	Safety control
5	Light green	Equalizing reservoir
8	Carmine	Stop reservoir exhaust
9	Carmine	Sanding
10	Carmine	Brake application valve piston
11	Dark brown	Straight air-pipe to master-controller
17	Gray	Equalizing piston exhaust (Suppression)
18	Light green	Second reducing reservoir
19	Orange	Suppression reservoir
21	Orange	Feed valve
23	Orange	First suppression reservoir
24	Dark green	Reducing limiting reservoir
25	Carmine	Pneumatic relay
26	Gray	Temporary suppression
29	Carmine	Governor
30	Carmine	Main reservoir
38	Light brown	Straight air
39	Carmine	Acknowledging relay



SKETCH 4

Color Chart

PRESSURE	COLOR	FILL IN	NO.	REMARKS
Atmosphere	Clear....			No color
Auxiliary Reservoir	Dark Green	☐	868	All types of equipment
Application Chamber	Light Blue	☐	845	6, 8 and 14-EL equipment
Application Cylinder	Light Blue	☐	845	6, 8 and 14-EL equipment
Application and Release Pipe *20*	Light Blue	☐	845	24-RL equipment
Actuating Pipe *13*	Purple	☐	844	24-RL equipment
Application Pipe *10*	Carmine	☐	876	Safety-train control
Acknowledging Relay Switch Pipe *39*	Carmine	☐	876	24-RL equipment
Brake Pipe	Yellow	☐	867	All types of equipment
Brake Cylinder	Pink	☐	846	All types of equipment
Control Pipe *16*	Dark Brown	☐	863	24-RL equipment
Control Pipe *11*	Dark Brown	☐	863	Electro-pneumatic brake equipment
Controlled Emergency Pipe	Carmine	☐	876	24-RL-equipment
Control Air	Heliotrope	☐	864	Diesel-Units.
Displacement Reservoir	Dark Brown	☐	863	24-RL and D-22 equipment
Distributing Valve Release Pipe	Light Blue	☐	845	6 and 14-EL equipment
Emergency Reservoir	Orange	☐	862	24-RL, D-22. AB, U-12 equipment
Equalizing Reservoir	Light Green	☐	848	All locomotive equipment
Equalizing Pipe	Heliotrope	☐	864	Double heading 6 and 14-EL
Exhaust Steam	Orange	☐	862	Steam Compressors
Feed Valve	Orange	☐	862	All locomotive equipment
High Pressure Air	Dark Green	☐	868	Air compressors
Live Steam	Carmine	☐	876	Steam compressors
Low Pressure Steam	Pink	☐	846	Steam compressors
Low Pressure Air	Light Green	☐	848	Air compressors
Main Reservoir	Carmine	☐	876	All locomotive equipment
Maintenance-in-Emergency Pipe *12*	Orange	☐	862	24-RL equipment
Pressure chamber	Light Green	☐	848	6, 8, and 14-EL equipment
Quick-action closing chamber	Heliotrope	☐	864	24-RL, AB, D-22 and U-12 equipment
Quick-Action closing chamber	Heliotrope	☐	864	U-12 equipment
Quick service chamber	Heliotrope	☐	864	Continuous quick service valve
Reduction chamber	Dark Brown	☐	863	8 equipment
Reduction limiting reservoir	Dark Green	☐	868	24-RL, 8 and D-22 equipment
Reducing Valve	Dark Blue	☐	865	All locomotive equipment
Second Reduction Reservoir	Light Green	☐	848	24-RL equipment
Signal System	Light Blue	☐	865	All passenger equipment
Supply Reservoir	Carmine	☐	876	D-22 equipment
Service Reservoir	Light Green	☐	848	U-12 equipment
Suppression Pipes *17, 26* and *27*	Gray	☐	819	24-RL equipment
Suppression Reservoir (First and Second)	Orange	☐	862	24-RL equipment
Suppression Reservoir and Pipe *19*	Orange	☐	862	Train control
Stop Reservoir	Carmine	☐	876	Train control
Stop Reservoir Exhaust Pipe *8*	Carmine	☐	876	Train and speed control
Straight Air Pipe	Light Brown	☐	863	Electro-pneumatic brake
Safety Control Pipe *3*	Carmine	☐	876	24-RL equipment
Sanding Pipe 9	Carmine	☐	876	Manual sanding
Timing Reservoir	Gray	☐	819	24-RL equipment
Timing Volume Reservoir	Dark Blue	☐	865	Train control

How Different Are 1956 Interchange Rules?

The annual review of interchange rules revisions was presented to the Eastern Car Foremen's Association at the February 10th meeting by T. J. Boring, Supervisor of the Pennsylvania's MCB Clearing House. Some of the changes are revisions in billing charges brought about by increased material and labor costs, and Boring reviewed the trend of freight repair costs from 1895 to the present. He also discussed the large sums of money involved in interline billing. In 1939 the total was $31 million with nearly $10 million paid by private car line operators. Material and labor costs have tripled since then.

Some changes were made in the Interchange Rules in Supplement 1 effective August 1, 1955, and in studying the changes indicated in the front of the 1956 Code of Rules, particular attention should be paid to the following sections.

Rule 2

Section (d) New Paragraph 4 added "Mechanical refrigerator cars should have a manual covering inspection, servicing and maintenance of the cooling or heating equipment installed therein in a special receptacle in the unit compartment. This manual is to remain with the car at all times."

Rule 3

The effective dates of the following Sections have been extended one year to January 1, 1957:

Section (b-7)—Metal brake lever badge plates.

Section (f-3)—Lading strap anchors on flat cars.

Section (w-4)—70 ton capacity cast-iron wheels on covered hopper cars. They are prohibited on cars built new or rebuilt on or after August 1, 1954.

Added in August 1, 1955 supplement was the following:

Section (t-1-d)—Effective January 1, 1956, all cars equipped with Allied full-cushion trucks must have improved type swing hangers and improved swing hanger shoes in interchange. Cars equipped should have 2-in. high letters "SHR" stencilled on the body over the truck.

Section (t-3-b) has been modified by adding a new last sentence prohibiting cars equipped with I, T or L section truck side frames *in interchange* effective January 1, 1957. Effective January 1, 1956 they were prohibited from owners.

Rule 9

Cars reweighed and remarked was modified to clarify the intent that when car bears no *light weight* or load limit markings, repair card should state this. Words "light weight" have been added.

New Item "Cast steel truck side frames and bolsters" was added to require that the following be shown on repair records: new or secondhand, pattern and/or drawing number, nominal capacity, and date cast, where shown. It is very important that complete information including weights be shown. If pattern or drawing number is illegible or missing, so state. See Rule 17, Paragraphs (n) and (o), to avoid wrong repairs.

Can You Answer . . .

- **What settlement is made for a piggyback trailer damaged in transit on a flat car?**
- **Is exact journal diameter reported on billing repair card now that controlled clearance bearings are mandatory?**
- **If a belt-driven floor circulating fan sets fire to a refrigerator car, who is responsible for the damage?**
- **When a car is found to have two types of brake beams under it, what type should be used when replacement is necessary?**

Rule 17

Section (e) Note 6 states that "the majority class of beams under car, or if two beams are of heavier type, such majority class or heavier type will be considered as standard to car." Never substitute a lower class beam for No. 18 beam since note 9 hereunder, and note 2 following price table for No. 18 beams on page 222, provide a considerable penalty for wrong substitution.

Rule 22

New Item (16), Underframes, Cast Steel was added to provide that splice plates are not required in making underframe repairs to cars having cast steel underframes and that restrictions are limited to paragraphs 1, 2 and 3 of section A. Rule 23 covering general welding regulations.

Rule 30

Section (B) Periodic Light-Weighing. Type LP (pulpwood) cars were added and provide for the same time periods as for all-steel flat cars.

Section (E) Method of Light-Weighing was modified to permit reweighing of cars *in motion* uncoupled and free at both ends, "on scales equipped with an automatic device for weighing and recording weights of cars in motion."

Rule 32

Paragraph 10 (k). Note 1 added effective August 1, 1955 reads "In case of fire damage to a refrigerator car caused by floor type air circulating fan, belt, or other part of said appurtenance, car owner is responsible for all damage to fan arrangement. Responsibility for any resultant fire damage to car shall be in accordance with paragraph (10-k) of this rule." This new Note makes a division of responsibility for the fire damage and it is extremely important that such cases be reported promptly to your central office, giving initials and number of car, place and date of damage and where car is held and followed with usual reports. Car owner may wish to participate in joint inspection.

Section (12-a). Box cars placed for the loading of

contaminating commodities should be preferably system cars suitable only for rough freight loading. There have been cases which cost $500. to $800. for repairing such damage to foreign cars. Also carry out the provisions of Section (12-b) when contamination damage is discovered in foreign or system cars, and make complete report to your central office.

Section (12-b) was modified to provide that car owner must give road responsible for contamination of car an opportunity to inspect such car as outlined in Interpretation No. 3 under Rule 4. This is the same procedure as with cars damaged by flood or fire. System cars found contaminated under provisions of this rule must be reported promptly to the central office and car held until such time as the road responsible has been given an opportunity to make inspection.

New Interpretation No. 11 was added to provide that settlement for damage to truck trailers used in piggyback service or loss of parts from such trailers does not come under the provisions of the Interchange Rules as they are considered part of the car lading. It was also the opinion of the A.A.R. Arbitration Committee that such cases should be handled by the freight claim departments of the roads involved.

Tank cars containing or that last carried motor fuel anti-knock compound (tetra ethyl which is Class B poison), and other very dangerous commodities, if leaking or badly damaged, should be immediately reported by wire or preferably by phone. In such cases the car owner or shipper (especially the DUPX) often desires to send experienced help who have been trained and know what precautions and methods should be used.

Rule 66

Paragraph (g-2): modified to the effect that where journal boxes are repacked under provisions of this paragraph, no additional charge for labor is permissible for renewal of journal bearings or wedges in either truck.

New Section (k), and Journal Bearing Identification Table has been added to provide for renewal of journal bearings on the basis of controlled bearing clearances recently adopted by letter ballot as an AAR standard practice, effective March 1, 1956.

Billing repair cards need show, as heretofore, only the nominal length of journal, new or secondhand, and box number, as prescribed in Rule 9. Terms "A-1," "A-3" or "A-5" need not be shown to describe journal bearing diameter. Paragraph (k-4) states "When renewing bearings on cars enroute, in classification yards or set out of trains on sidings, full diameter bearings (A-1) may be applied," which is also true when proper reduced diameter bearing is not available.

The Note under Paragraph (k-3) warns against applying a bearing of diameter smaller than the journal diameter. See Fig. 6-B on page 181 for "Journal Diameter Gage" prescribed for determining proper bearing.

Rule 69

New Note under Paragraph (g) was added to provide for turning of axles for AAR standard controlled clearance journal bearings as outlined in new Paragraph 171 (b), and addition to Paragraph 355 (c) to be added to Wheel and Axle Manual.

Gages: New figure 6-B added on page 131 showing method of applying 'GO' gage to axle journal to determine proper journal bearing to be applied for controlled clearance. See comments above under Rule 66, new Section (k).

Rule 86

New Figure added on page 193 showing Journal Diameter Dimensions for Controlled Bearing Clearances. This will be new figure 108-E in the Wheel and Axle Manual to govern the turning of unmounted axles, other than roller bearing axles.

Rule 91

Sections (a), (c), (d), Note under (f) and Interpretation (6): Modified to provide limit of $2.00 instead of $1.00 for minimum amount of monthly bill which can be rendered, exceptions taken, etc.

Rule 98

Paragraph (f-3) modified to require the handling line to also assume responsibility for loss of service metal and labor of turning where multiple wear wrought-steel wheels require turning when removed because of cut journal, except when such wheels require turning due to owners defects on either wheel.

Paragraph (f-4) modified to indicate that requirements of this paragraph apply to the *axle* as well as wheels to correspond with revised Paragraph (f-3).

Interpretation (4), "In Case of Delivering Line Defects" was modified to clarify the intent that this portion of the interpretation applies to the *axle* as well as wheels to correspond with revised Paragraphs (f-3) and (f-4).

Rule 101

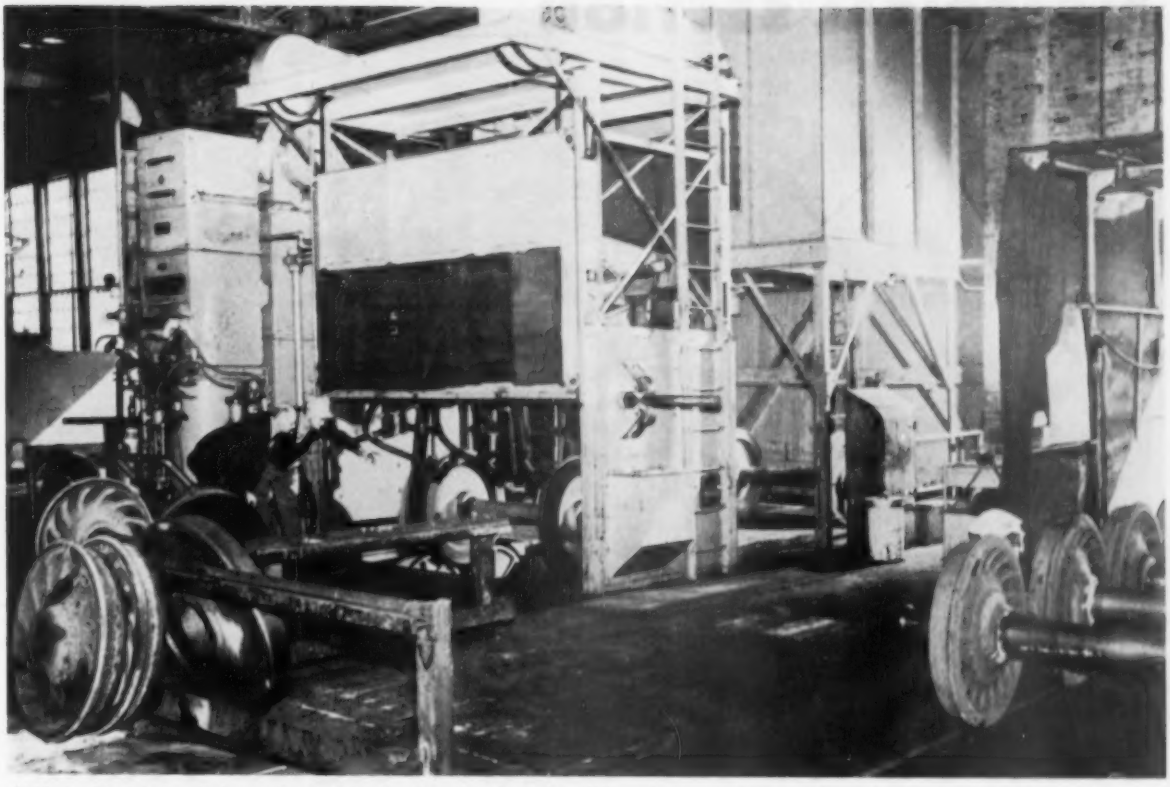
Material Charges: price adjustments have been made in line with recent quotations resulting in a general increase approximating 7 per cent, except AB air brake material which was increased 10 per cent.

K type air brake material: 44 items of K type air brake material, between Items 3 and 44 are eliminated because they are seldom used; also, second paragraph of the note preceding Item 44. New Note was added under "Air-Brake Equipment," preceding Item 1, reading "For items of K brake material not listed herein, allowances and references as specified in Rule 101, and section (L) of Rule 104 of the 1955 Code and Supplement No. 1 thereto, will govern."

Item 106-B, New note was added to clarify the intent that a wood brake step substituted for metal brake step standard to car should be charged on securement and material basis. Billing repair card must show size of stepboard and bolts applied including split bolts. Defect card for labor only should be applied to car in cases of owners responsibility and for labor and material in cases of handling line responsibility, as outlined in Rule 17 (r). The second paragraph of this new Note provides that where wood brake step is applied in kind in connection with vertical geared hand brake, it shall be charged as outlined above but defect card is not required.

"Draft Gears," Paragraph 4, (Page 223) was modified

(Continued on page 96)



Airblast cabinet is installed over the track leading into the wheel shop. When the power doors are lowered, the six adjustable nozzles direct abrasive at every part of the surface of the wheels and axle.

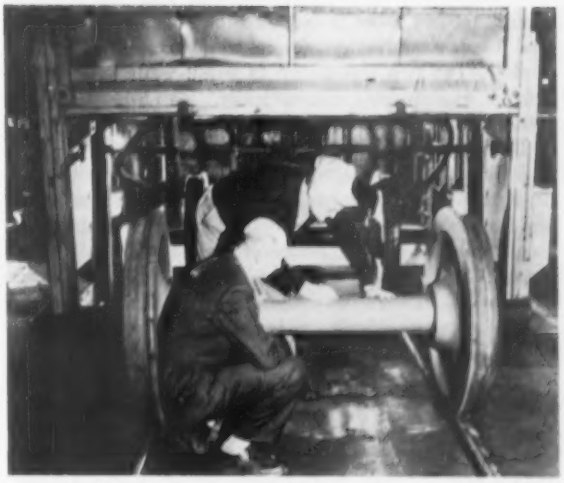
At the Omaha Shop . . .

U.P. Cleans More Mounted Wheels Faster

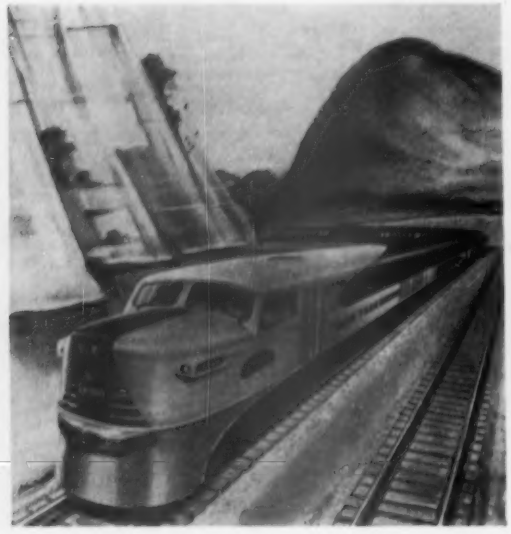
Cleaning speed was tripled and considerable handling of wheel sets was eliminated when the Union Pacific began to use a specially designed airblast cabinet in the wheel shop at Omaha, Neb. Prior to the installation of the air blast equipment, wheels and axles were cleaned separately. Axles were wire-brushed and the assemblies then moved to another department where the wheels were sand blasted. Both new and reconditioned wheel sets are cleaned prior to Magnafluxing.

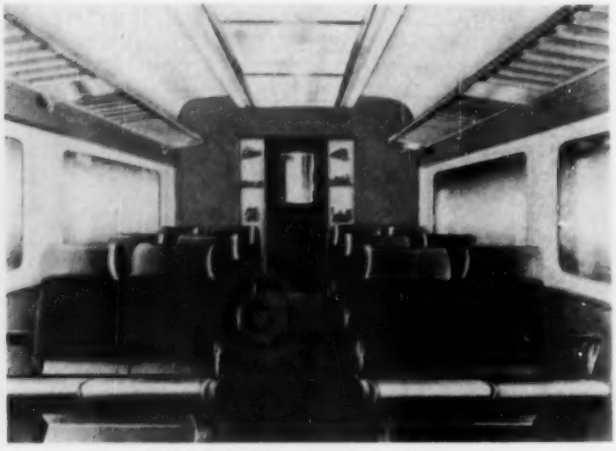
This airblast cabinet was manufactured by the Pangborn Corporation. After passing through the automatic airblast cabinet, the wheel sets then go on down the track to the Magnafluxing and machining operations. The cabinet has six nozzles, adjustable for a variety of wheel and axle sizes. There are two oscillating nozzles for each wheel and two nozzles which travel transversely along the axle. The wheel set is revolved in the cabinet during cleaning.

A dust collector and abrasive reclamation process operate as integral parts of the cabinet. G-40 angular grit is used as the abrasive.



Ready for Magnafluxing, the cleaned wheels roll out of the airblast cabinet. They are subsequently inspected, machined and balanced as they proceed through the wheel shop.





At left: An artist's conception of New York Central's Train "X"
Above: Interior of one of the cars as it will look when completed.

Train Power for Lightweight Trains

Current designs indicate that lightweight trains could do much toward standardization of passenger car designs

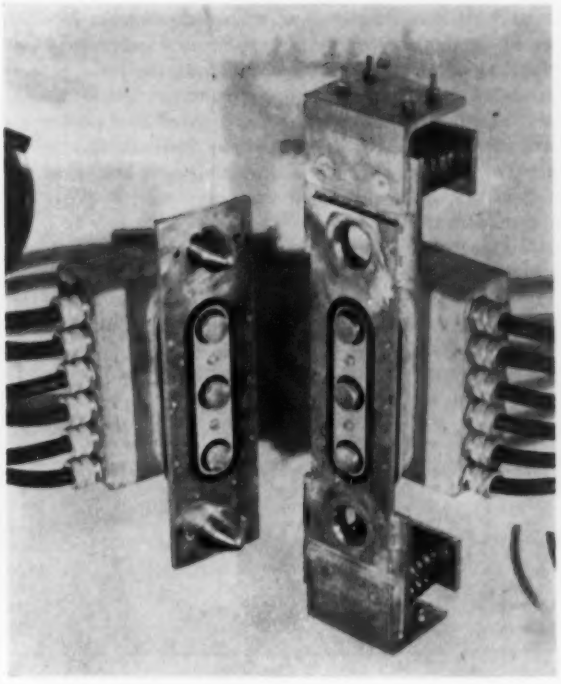
FOR MANY YEARS the iron horse rode alone. He had no equal. He had no competition. Born along with the present century was the horseless carriage which, it was said, would not last,—but it did. The idea of mass production and the assembly line developed along with the automobile. The two teamed up to produce millions of offspring, rapidly and economically. The iron horse lost many of his riders to the family car.

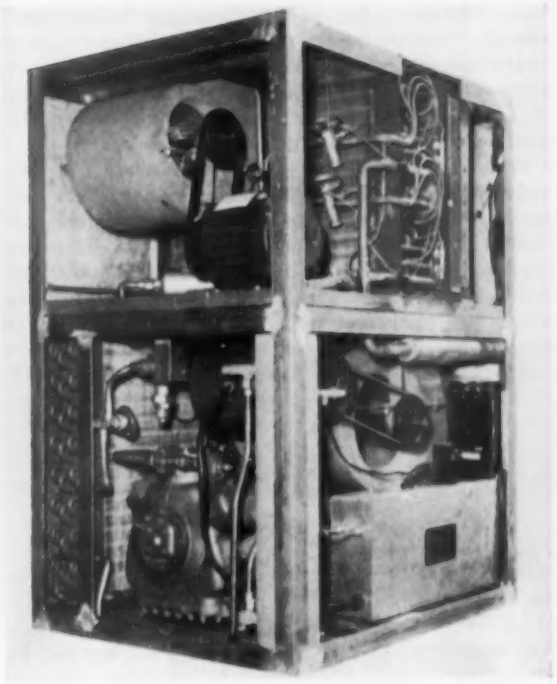
During this so-called industrial revolution, the railroads and their suppliers followed diametrically opposite paths from the general industrial pattern. Practically every other industry employed mass production and assembly lines to provide a cheaper, better product to sell at a lower price. Not so with the railroad industry, and by this term are included the railway equipment suppliers. Passenger cars were custom-built, to individual railroad specifications.

In the period, 1945 through 1953, Pullman-Standard built 1,235 domestic non-sleeper passenger cars from 151 different floor plans for 41 different customers; 43 per cent of these had less than 3, and 73.5 per cent had less than 7 cars per plan. In this same period, Pullman-Standard built 913 domestic sleeping cars, excluding troop sleepers, from 66 different floor plans and 36 different railroads. Of these, 21 per cent had less than 3, and 42.5 per cent had less than 7 cars per plan. While there are six basic types of sleeping accommodations, 25 different types were engineered and built. To point this condition further, practically all of these sleeping cars were turned over to the Pullman Company to operate and maintain. The Pullman Company, in order to operate this varied mass of cars, conducted extensive surveys and was able to achieve a degree of standardization by changing the cars after they took them over. A typical example was batteries. Cars were received by the Pullman Company, with 33 different types of batteries. With a minimum of structural change on the cars, this number was or will be reduced to nine as the batteries wear out.

The foregoing is an excerpt from a paper, "The Lightweight Train—Its Power Supply and Auxiliaries", presented by J. L. Swarner, at the Mid-Winter General Meeting of the American Institute of Electrical Engineers, held in New York, January 30-February 3, 1956.

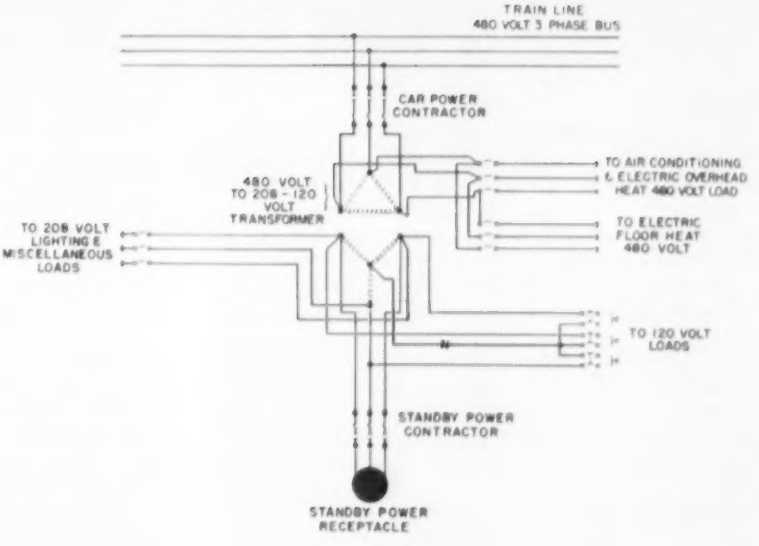
The new lightweight trains provide a means whereby the railroads may reduce motive power requirements, run at high speeds and use cars of standard construction. They have been proclaimed as the salvation of the railroad passenger business, but Mr. Swarner warns that they will





Above, left: Power coupler which will be mounted above the inner diaphragm.

Above, right: An air conditioning unit with its covers removed.


TRAIN LINE
480 VOLT 3 PHASE BUS
CAR POWER CONTRACTOR
480 VOLT TO 208 - 120 VOLT TRANSFORMER
TO AIR CONDITIONING & ELECTRIC OVERHEAD HEAT 480 VOLT LOAD
TO ELECTRIC FLOOR HEAT 480 VOLT
TO 208 VOLT LIGHTING & MISCELLANEOUS LOADS
TO 120 VOLT LOADS
STANDBY POWER CONTRACTOR
STANDBY POWER RECEPTACLE

At right: Basic power circuit for Train "X"

not live up to expectations unless they fulfill several basic requirements. They must, he says, effect weight reduction without sacrifice of comfort and convenience, they must incorporate sufficient standardization to permit production of car units in quantities allowing for mass production techniques. They must be built at a cost low enough to provide a better service at equal or lower cost than other forms of transportation and they must effect a reduction of maintenance and servicing.

Train Power

Auxiliary power requirements for passenger trains have grown enormously in recent years and there are three means of supplying this power. One is the axle gnerator with its associated battery, the second, the engine-driven generator for individual cars and the third, is a central or head-end source of power, feeding the cars through a train line.

Mr. Swarner points out that both the axle generator equipment and the engine-driven generator must be mounted under the car floor, and that the new cars with their lowered floor heights do not provide the necessary clearances. He also produces data showing that the weight of undercar equipment is high, and in the case of axle generators, the power required from the locomotive is large.

Consideration of all the factors involved resulted in a decision to supply all the power required for heating, light-

ing and air conditioning on the two "X" trains now being built, respectively, for the New Haven and the New York Central, from the locomotives. The New York Central locomotive will be equipped to supply 300 kw, and each of the New Haven locomotives 250 kw. Train X is made up of four cars, each consisting of two permanently connected units and a center car.

Power will be generated at 480 volts, 3-phase, 60-cycles, and distributed through an aluminum bus bar system, with automatic couplers near the roofs, between cars and contactors which relieve the coupling contacts of making or breaking circuits. The bus bar system is rated at 600 amp and completely assembled with covers and hangers, weighs 6 lb per foot or 2,307 lb for the train. The mechanical coupler carries 42 control wires, all at 64 volts for brake, signal, locomotive and miscellaneous control circuits. When two locomotives are used, the rear locomotive is controlled from the front end.

Car Power System

The basic power system is shown in the wiring diagram.

Power is taken from the three-phase bus bar trainline to a three-pole, magnetic, contactor, with overloads on each phase.

All loads, possible, are fed directly off the 480 volts. Air conditioning motors and all heating elements operate on 480 volts. This permits the use of a small transformer for lighting and miscellaneous loads only. Lighting is fluorescent, with 199/216 volts ballasts. The few incandescent lamps operate on 120 volts.

The transformer is connected delta-wye. The primary side is 480 volts delta-connected, the secondary is wye-connected, for 208/120 volts.

On standby service, the insertion of the standby power plug, isolates the unit from the train, by locking out the power contactor to the trainline. The secondary of the transformer, that is the 208/120-volt side, becomes the primary and 480-volts is taken from the delta side, for circuits of this voltage.

The overhead electric heat is locked out on standby, primarily due to capacity of yard standby power supplies. This limitation permitted using a smaller transformer than would have been possible if all 27 kw of electric heat were to be drawn from wayside power. It was considered, that at all times the train was in service, the head-end power system would be connected and in operation and standby service would only be used for a detached unit in the yards.

Heating System

The heating system is all-electric. Consideration was given to a water system and to the use of a unit oil-fired boiler in each car, but these were discarded because of complications and servicing requirements. The conventional steam heating system was also ruled out because of possible freezing and other complications associated with automatic coupling.

The electric system, Mr. Swarner explains, offered the most overall advantages. Experience has proven the very low maintenance cost of this method of heating. Transmission losses are very low, and methods of coupling transmission lines between cars is simple, compared to other systems. Only one source of energy is required, per train, for all auxiliaries. Only one energy transmission line is necessary. It is composed of low maintenance items of standard manufacture,—namely strip heaters and contactors. It has two elements; the overhead unit, incorporated in the air conditioning unit to temper fresh air consists of an 18-kw finned rod unit; the floor heat is made up of strip heaters, approximately 6 ft long, having a total capacity of 9 kw. Only two sizes of floor heat strips are used throughout the train. The vestibule section, of the two section car, has a special length heater in the toilets. All other units in the train are exactly alike and interchangeable.

To meet the need for two steps of heating, and to save weight and cost, the heaters are connected in delta, for full heat, and reconnected in wye for low heat. Therefore, there is 18 kw of electric heat at the high setting and 6 kw at the low connection, for the overhead air tempering. On the floor heat, the high setting is 9 kw, the low setting is 3 kw.

COMPARATIVE WEIGHTS OF HEATING SYSTEMS—TRAILING UNITS

System	Weight per unit (lb)	Weight per train (lb)
Water loop	1,434	12,906
Steam	470	4,230
Unit boiler and radiation	936	8,424
Electric	150	1,350

Air Conditioning

Each unit of train "X" has a 6-ton air conditioning unit, which is a complete package, assembled, charged with F-12 and tested at the factory.

The unit is designed to be installed in the car through removable panels on the side of the car. The removable panels contain the condenser air inlet, the fresh air grille and the exhaust outlet. Electrical connections to the units are plugs and receptacles. Duct connections must be completed, for car air supply and recirculated air, after the unit is bolted in place. Condenser air discharge is through the bottom of the car.

Here again, every effort was made to design an air conditioning system which was light in weight, exactly identical for each car unit, easily replaceable, and made up of proven components. The compressor is the sealed type. All motors are 440-volt, three-phase, 60-cycle. All contactors and controls are mounted in a box, as an integral part of the unit.

With spare units available, the railroad will be able to service them, in the shop, under ideal conditions and not hold a car out of service.

In the design of the package system, it has been determined that any of the refrigeration equipment suppliers can produce a unit, to be applied in the same location, be conforming to outside dimensions and air openings. In this way, standardization is achieved without limiting selection of equipment.

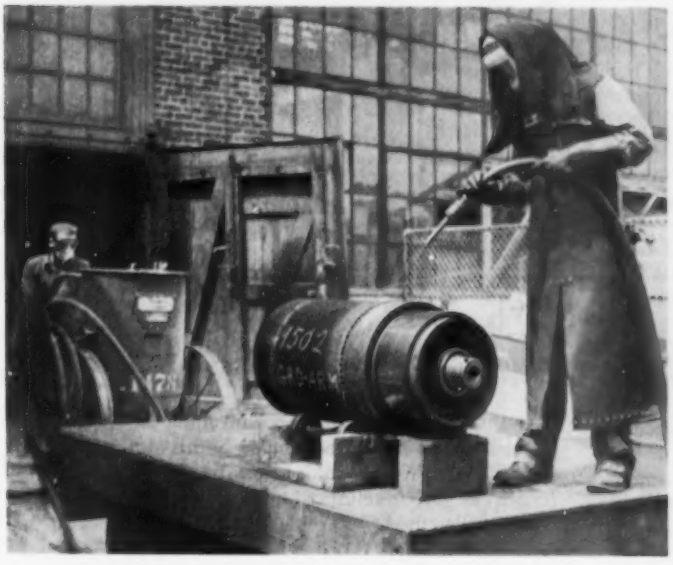
Lighting

The lighting system is designed to eliminate glare sources, to provide well diffused illumination, to have an illumination level of 40 foot-candles on the reading plane maintained, and to permit group lamp replacement and cleaning at normal intervals.

The illumination in the passenger compartment consists of two components. One is a large luminous element, which forms the lower surface of the main air duct. Two rows of rapid start, T12-48-in. fluorescent lamps are mounted on strips, at the top of the air duct, to provide even illumination of the diffusing panel. The inside of the duct is a white plastic coating. The second element is indirect lighting, on each side of the air diffusers, which parallel the luminous panels. Here too, the T12-48-in. rapid start lamp is used. Either the direct diffuser, the indirect, or both, can be used, as desired. All circuits are balanced across the three phase lines. Ballasts are rated 199/216 volts. Three lighting levels are available at approximately 15 foot-candles with indirect lighting only, 30 foot-candles with direct diffused only, and 40 to 50 foot-candles with both. The use of cool white deluxe lamps provides good color rendition to complement the color schemes.

An incandescent night light circuit is provided in the direct diffused element, to provide a very low level, for service where passengers might desire to sleep.

There are emergency lights in each unit supplied with power by a standard 6-volt storage battery, complete with automatic charging facilities.



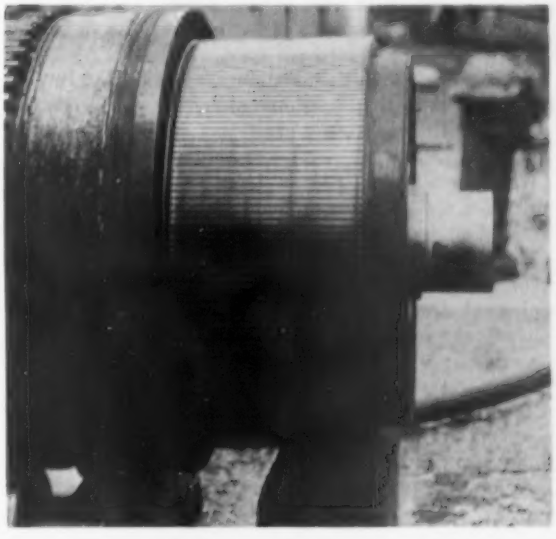
Above, left: The armature being cleaned is mounted on rollers so that it may be rotated easily by the operator.
Above, right: Regulation of pressure in the tank and air through the hose are varied to suit the cleaning requirements.

B&M Does Its Corn-Cobbing Out-of-Doors

Cleaning of electrical equipment with a blast of ground corn cobs is done out-of-doors on the Boston & Maine. The parts to be cleaned are placed on a small platform car and pushed out on a track through one of the shop doors. This keeps the residue of cleaning out of the shop and gives the operator ample room for working.

The Pangborn pressurized tank which supplies the cleaning nozzle is on wheels, so that it can follow the car out of the shop. When the tank is filled with ground corn cobs, the filling opening is sealed by means of the handle shown at the top of the tank at the left. There are two air valves, one supplying air pressure to the inside of the tank, and the other supplying air through an ejector to the nozzle. There is an air gage on each air line and the pressure on each is adjusted to give the correct amount of abrasive with the best corresponding speed of air out of the nozzle.

The nozzle shown in use has a ¼-in. diameter orifice. The operator wears protective clothing, of which the rubber gloves are an important part, since they protect him from the static caused by the passing of the abrasive through the hose.



The process can be used to quickly and effectively clean electrical equipment without damage to the insulation.

High Voltage

By Gordon Taylor

AN ENGINE CREW noticed the train speed slowing down on a three-unit diesel. At first, it was thought the brakes were dragging. When an attempt to release brakes did not improve the situation, the fireman thought some of the engines were not loading up and decided to check the power plants in the various units.

In the *B* unit he found the ground relay properly set. The battery field contactor was found to be okay. The engine was isolated or taken off the line. The fireman then opened the power control cabinet, with the *Danger 600 Volts* sign on the door. He then released the arc chutes over the power contactors and operated all contactors by hand. He then put the engine back on the line and went to the rear *A* unit to check its contactors.

After checking the rear unit, he returned to the *B* unit, and in the words of the honest fireman, ". . . . . that was where I made my mistake. I thought I had the engine off the line—but it was still on the line!"

The fireman reached into the high voltage cabinet and pressed down the magnet valve with one hand, holding a flashlight with the other. An electric flash or arc from the breaking of the circuit by parallel contactors severely burned the backs of both hands.

When the power contactors opened under load, without protection of the loosened arc chutes, the current flashed to "ground," causing a surge of current from the main generator which flashed the generator and opened the ground relay.

The engine was then isolated and the trip resumed without further incident.

The fireman in this case, while being unlucky in placing himself needlessly in a hazardous position, was extremely lucky to emerge with only burned hands.

He could have received very serious injuries or might have lost his life.

No one, engineman or maintainer, can afford to invade the danger zone that is protected by the sign—*Danger 600 Volts*. The risk is too great and the price you may pay is too great.

Who can afford to pay the price of death or serious injury for the privilege of tampering with high voltage electrical equipment?

For the reason just stated, the crew members have never been instructed to tamper with the high voltage equipment. On the contrary, warning signs on the high voltage cabinets are displayed for the protection of all concerned.

It is necessary for the electricians and maintainers to work in the high voltage cabinet, but these men have been instructed to never adjust or work with the 600-volt equipment with power on the line. It is their business to know how to protect themselves and they know the price they have to pay for carelessness.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

Signs are put up for the maintainer's protection.

In the case of a crew member invading the high voltage cabinet, he is at a disadvantage as his duties have not caused him to form a habit of protecting himself. He may forget, as did the injured fireman, and what happens comes under the heading of "just too bad, he was a fine man but he forgot."

Some men think they are being careful when they use a flag staff or stick of wood to poke a contactor closed. That is not good judgment either. You may close a contactor that should not be closed and burn up a lot of electrical equipment.

It is the duty of the maintenance force to keep the electrical equipment in working order, and operating forces should not undertake to take over the duties of automatic controls by operating contactors and relays by the use of sticks or by hand.

The lesson to be learned: Respect those *Danger* signs on the high voltage cabinet doors, and do not tamper with what is behind the doors.

Shiny-Bottom Pulleys

A V-pulley groove is like a blue serge suit—when the bottom becomes shiny, a lot of wear is indicated.

The shine in the pulley groove is a sign that the pulley, the V-belt or both are badly worn. It comes from the belt bottoming in the groove, thus losing wedging action and maximum pulling power.

If the pulley groove is worn or oversized, increasing V-belt tension will simply make belt and pulleys wear even faster. Worn pulleys should be replaced. The same goes for worn belts.

A railroad "Under the Lights"—Night view of the Seaboard's classification yard at Hamlet, N. C. It is lighted entirely by floodlights including 113 1,500-watt and 4 2,000-watt units. The adjoining receiving and departure yards, diesel shop area and icing platforms are also floodlighted, the complete installation employing 423 floodlight units, rated at 441,800 watts.

Planned Locomotive Maintenance

To the Editor:

The article on planned locomotive maintenance by Guy Franklin in your January issue contains some very sound opinions relative to the necessity for a definite program for preventive maintenance for diesel type motive power. All manufacturers have been stressing the importance of programmed inspections and replacements of certain parts after definite mileages or time periods ever since this type of power has been made available to the railroads. Mr. Franklin emphasizes that if the entire service potential built into the unit is to be realized, planned maintenance will allow this to be done at the lowest cost.

Exception is taken, however, to the theory Mr. Franklin seems to promote, which is also promoted by some manufacturers, that service mileage equivalent to that which has been performed by the unit can be put back periodically into the equipment by maintenance. In my opinion, this is fallacious. If this were true, there would be no need or basis for depreciation accounting specified by the I.C.C.

Any machine that performs work, and this includes all motive power, has a definite amount of total economic service performance,—call it mileage, or life,—built into it. Some parts have more service potential, when the equipment is new, than other parts. The parts having the relatively shorter life must be renewed, after they have performed their full economic service, if the full economic life of the other parts having longer life and greater value is to be realized. Renewing such parts, however, adds nothing to the economic life potential of those longer life parts. Such maintenance simply enables the continued use of the entire unit containing these more valuable parts having the longer service potential.

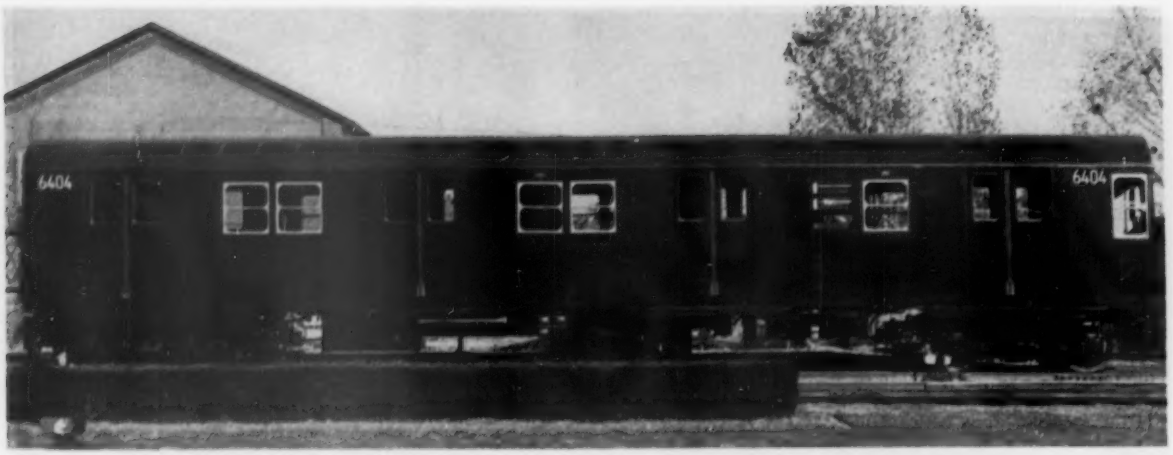
As an illustration of this point, brake shoes will wear out before the wheels. Replacing brake shoes will add nothing to the life of the wheels. The wheels must be turned two or three times, and then they, and perhaps the gears, are worn out and must be replaced. Their replacement adds nothing to the life of the motors. Possibly the motors will need replacement after the second set of wheels are worn out. Their replacement adds no more life to the engine and generator, which in turn must be completely rebuilt eventually after definite service performance. The rebuilding or replacement of these vital parts adds no life extension to the car body, underframe, trucks, wiring, and other long-life parts in which eventually will appear definite signs of fatigue. Each progressive maintenance step simply restores the entire unit to service, and allows further use of the remaining service potential originally built into it.

Ultimately there comes a time when so large a proportion of the entire unit value must be renewed at the same time, that good management combined with sound cost-accounting says, "This machine is worn out; it will not be economical to spend more money on it. The service potential and the original investment have been drawn down to zero. The account is closed." The mechanical officer who knows when this point has been, or will be, reached, and who can tell has accounting officers the term of years the depreciation accounts must run so that the investment account will be balanced when the service account is closed, will enable his railroad to put more operating revenue into earnings instead of into *Account 311*. He will also be enabled to plan his motive power maintenance more economically.

Money can be poured into *Account 311* continually, and any locomotive, steam or diesel, can be made to operate indefinitely to move tonnage. This is not necessarily successful railroad operation.

The successful operator will know when it becomes cheaper to move the tonnage with new locomotives.

F. B. Harworth



Ornamentation is omitted in exterior finish because most of the car service is performed underground.

Trends in Rapid Transit Car Design

Many innovations are incorporated in cars which have swivel trucks and overall body dimensions similar to older designs

STANDARDIZATION, such as occurred when the PCC trolley car was developed in the mid 1930's, has not been applied to rapid transit cars. Each operating agency has its own ideas of what it needs to meet its passenger requirements. Some operators design cars with narrow aisles and limited standing area, features which other operators cannot tolerate because of the large volume of traffic in the rush hours.

In New York City, in the 10-year period between 1947 and 1957, 1,600 new subway cars will have been placed in service. Transit authorities in Paris, London, Stockholm, Toronto, Cleveland, Boston, Chicago and Oslo have also been buying or planning to buy new rolling stock.

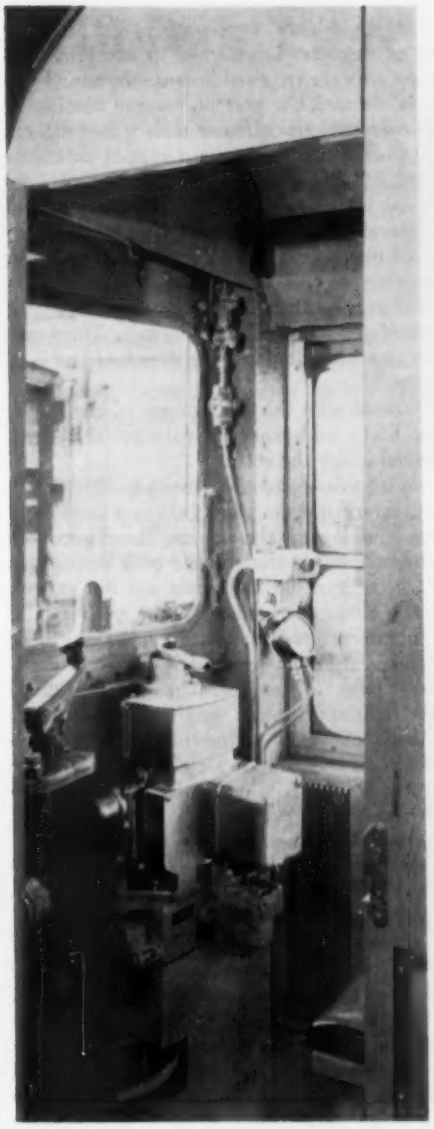
The influences of circumstances on design with special reference to New York Subway cars were outlined in a paper by Reginald G. Welch, division engineer, cars and shops, New York City Transit Authority, presented before a meeting of the Eastern Car Foreman's Association held in New York, on November 18, 1955. Excerpts from the paper are included in the following.

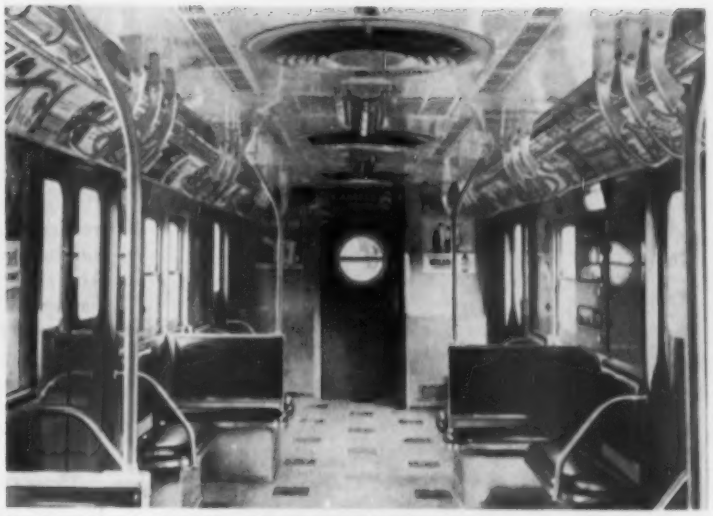
There are trends of design which are being followed by most operators such as use of corrosive resistant high strength steels for the car structure and light allows for interior finish and hardware. Adoption of anti-friction bearings to replace all friction bearings is becoming almost universal. In New York all cars purchased since 1947 have dynamic braking. Operators in other cities have lately adopted dynamic braking. Some that didn't, now wish they had. Fluorescent lighting and better ventilation are considered desirable by most operators.

The latest subways cars have made use of all materials and devices that will, as far as we now know, provide for long life and reduction of maintenance costs. To meet these objectives simplification of design has been stressed wherever possible as well as use of new materials.

Couplers provide for automatic connection of electrical control circuits.

Perhaps the most evident changes as far as the riding public is concerned are the interior finish and equipment. In cars purchased recently, rigidized stainless steel is used below the windows. The stainless steel is polished and no





At left: One of the motorman's control positions.

Above: Illumination is supplied by continuous fluorescent units.

Below: The most apparent changes, under a car, are the package control units with simplification of wiring and location of components to facilitate maintenance work.

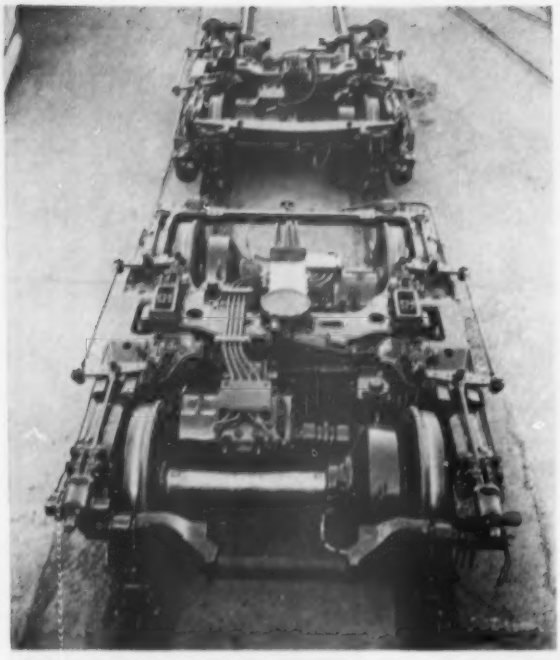
paint is used, so repainting will never be required. The doors and interior panels above the window sills are of aluminum finished with a high grade of enamel. Use of stainless steel for doors and interior panels above the window sills was considered but abandoned because of weight and assembly difficulties. The ceiling sheets are of porcelainized aluminum with hinged perforated grilles of aluminum, finished with baked enamel.

Fluorescent light fixtures are of extruded aluminum with short sections of molded glass designed to give even light distribution. Light levels at the reading plane are in excess of 20 footcandles.

The use of Magnesite flooring has been abandoned in favor of asbestos Vinyl tiles installed over aluminum truss plate and light flexible underlayment. The mottled gray overall pattern is relieved by use of a few mottled black tiles.

The new seats have aroused considerable attention. However, the simplicity of their design is not readily apparent. The red, fire resistant, fabric supported, Vinyl covering is noteworthy as well as the fire resistant cushion material. A detailed examination of a seat cushion would reveal that it is now assembled of some 15 to 20 pieces instead of 250 to 400 pieces previously used. While the foam cushion is at present somewhat more expensive than older materials, the covering material costs less. Repair and assembly is a matter of minutes instead of hours, so the overall costs for maintenance will be less. Vandalism accounts for much of the damage to seats and it was feared malicious destruction would increase with the new design. As with many new things vandalism may increase for a while but usually settles down in time. In any case, cost of repair is so much less that the change to the new design is warranted.

In the interior view, the ceiling grilles and fan louvres are easily seen. These are a part of the new ventilation scheme making use of large capacity fans to bring in outside air and recirculate interior air. The fans and heaters



Trucks have cast steel frames with transom-hung motors and flexible coupling between the motors and the gear reduction units.

are automatically controlled to provide maximum comfort in all weather. Experiments are being made with air conditioning. Whether cars will be equipped with conditioners, will depend upon test results and cost figures now being studied.

No attempt is made to provide a really outstanding exterior finish. With much of the service being underground, there is little incentive to dress up the exterior. Cars do not retain their gleaming newness long in subway service.

The most apparent changes under a car are the package control units, with simplification of wiring and location of components to facilitate maintenance work. The amount of equipment has increased with the adoption of dynamic braking, but better switch gear and new relay and contact designs have kept pace with the times, so that maintenance work is less than for many older, simpler controls. Two types of control have been delivered on the new cars. These are the pneumatic switch control of Westinghouse Electric Corporation, and the electric motor-operated cam control of General Electric. The latter employs a blower mounted on the m-g set shaft for forced ventilation of the resistors which are enclosed. Both types of control provide dynamic braking from top speed down to 10 mph. At that speed, the electro-pneumatic brakes provide the final braking of the car. This braking system is the result of a number of years experience and provides a smooth stop with complete control at all times including emergency features and assurance of air brakes in the event of a dynamic failure. The end result of the braking system has been great reduction in brake shoe and wheel wear.

The accelerating and braking rates are held constant under varying load conditions by means of empty and load controls. The accelerating rate of all new cars is 2.5 mphps. Service braking is at the rate of 3 mphps, and emergency braking is at a rate of 4 mphps. To realize full advantage of these higher accelerating and braking rates, a group of new cars is assigned to one line. This means that fewer cars are required because the round trip running time is reduced. At present, we are continuing the use of the cast steel truck frame with transom hung motors and flexible couplings between motors and gear reduction units. All truck springs are coil springs and riding smoothness is increased by use of rubber pads and vertical and lateral shock absorbers. The motor leads can be connected or disconnected in a matter of seconds. The gear reduction unit is totally enclosed thus eliminating the loss of gear lubricant. The motors are equipped with roller bearings as well as the journals. Third rail shoe beams are now laminated and the shoe fuse box is of moulded bakelite.

Cabs are equipped with the microphone of the public address system. Eight loudspeakers for the public address system are located under the seats.

There are two schools of thought concerning the weight of rapid transit cars. Some designers believe a small light car with lighter equipment is the answer. Those operators faced with extremely heavy loads in the peak hours such as in New York, believe the large cars are the answer. Actually, there is some overlapping of the two designs. Some of the equipment used for heavy cars is also used on smaller, lighter cars. Some designers believe articulation with some form of semi-permanent intermediate couplings is the right approach to weight reduction. Such construction does reduce cab equipment and some auxiliaries with a resultant reduction in weight but some of the operating features are not considered desirable by transportation departments.

Actually the weight of new subway car underframes and shell has been much reduced over older cars because of the use of new high strength steels and new designs. The total weight of a complete car has not been reduced in the same proportion because with the adoption of dynamic braking, better ventilation and fluorescent lighting, weight has been added that offsets some of the weight saved in the body structure.

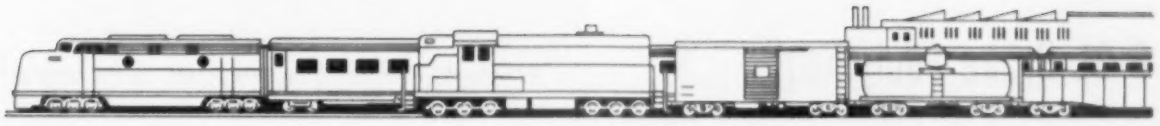
The designers of the new lightweight railroad coaches like to compare their new weight of 750 to 800 lb per seat with old figures of over 2,000 lb per seat. Those weights also mean weight per passenger.

It is interesting to note the weight per passenger for new subway cars. With only a seated load, the weight per passenger averages approximately 1,600 lb while with a rush hour load, the weight per passenger averages approximately 400 lb.

Considering the amount of equipment installed on a subway car, compared to a railroad coach, these weight relations are not unfavorable. In fact, with a 50 per cent standing load, the weight per passenger averages approximately 600 lb, somewhat less than the figure that the designers of new railroad cars are so happy about.

Further weight saving on the present subway car design is a matter of reducing the weight of each component by a few pounds. Such activity is constantly under way and suppliers are urged to consider all possible methods of weight reduction including use of light alloys. In all efforts to secure weight reduction, it is necessary to constantly check the effect on maintenance costs. A certain amount of ruggedness is desirable in subway equipment and some components are already as light as they can safely be.

Problem Page . . .



. . . WHERE THE TOUGH ONES ARE HANDLED

A new question this month. Remember that it pays you to share your ideas and experiences with our readers. Submit letters to the Problem Page Editor.

What have you found is the most successful way to clean the windshields of streamlined road passenger and road freight locomotive units? Should units be equipped with ladder brackets and handholds? Should cleaning be done from track-side platforms? Can it be done from the ground? Should intermediate division points do the job in a different way than locomotive terminals?

Hard-Riding Passenger Cars

When a passenger car is reported as a "hard rider," what is checked, and in what order is this work done? What are the most frequent causes of poor riding?

CHECK GENERATING EQUIPMENT, *by D. J. Ritchie, general superintendent motive power, Spokane, Portland & Seattle, Vancouver, Wash.* In many cases reports of "hard riding" are not due to truck conditions. However, when these reports are received, trucks are thoroughly inspected and particular attention is given to wheels, journal boxes, brake rigging parts, generators and generator drives, truck swing hangers, truck equalizers, center plates, bolsters, chafing plates and side bearings. There is no definite order in which the inspection or work is done, but all necessary work is performed. Most frequent causes of "hard riding" reports, we believe, are defective wheels, defective snubbing devices and defective generator drives.

WHAT TYPE OF CAR? *by W. L. Magee, Jr, coach foreman Houston Belt & Terminal, Houston, Tex.* There are nearly as many answers to this question as there are types of passenger cars and types of terminals. Terminals can be intermediate division points or the end of the run. The facilities a terminal has determines just how much can be done to the car. It would seem that there couldn't be much difference in the riding qualities of passenger cars, but diners develop different defects from baggage cars or coaches. A dining car that is rough riding is usually riding hard on the side bearing on the kitchen side. An ice activated coach usually rides side bearings on the ice bunker side. This is our first check since we find it the most frequent cause of hard riding.

The next truck defect to check for is weak bolster and equalizer springs or over-shimmed springs. When a car is reported, it has been a practice in many terminals to jack it up, and inspect and grease the center plates. Any binding at the center plate will cause rough riding. Bolsters have been known to bind on some four wheel trucks when new wear plates were applied during an overhaul. This will cause the car to lean to one side and rest on the side bearings. Shock absorbers can become ineffective.

There are many different wheel conditions which will cause a car to ride poorly. Flat wheels are usually reported as such because crew members can readily identify this condition. Tread worn wheels can cause hard-riding under a fast, light-weight train. These are usually found on trucks equipped with disc type brakes. Another defect found under equipment with these brakes is the double-flange wheel which is usually caused by too much lateral in the truck.

On disc-braked cars a rough-riding or out-of-round wheel can usually be detected on inspection because the vibration will shake the C-frame cap bolts loose. Sometimes the pedestal tie bar bolts will also be loosened. On cars with clasp type brakes an out-of-round wheel will cause a brake hanger pin to spin around while on the road leaving a tattletale ring on the hanger where the hanger pin cotter spring rubs.

If there doesn't seem to be anything wrong with the trucks, noises blamed on them can develop from the gear box of the drive unit, a bad drive shaft, an air conditioning compressor or motor, or the draft gear.

SHOPPING PROCEDURE, *by J. A. Canon, superintendent motive power, Northern Pacific, Seattle, Wash.* When a car is reported riding poorly, it is placed on a pit track where thorough and complete inspection is made. Defects and irregularities found are corrected. In the inspection all parts are checked because almost any truck part, if defective, out of place or improperly applied, can cause hard riding.

Our procedure is first a complete visual inspection which includes gaging of wheels, and measuring such items as height of springs, lateral of journal box assembly and side bearing clearance. Bolster anchor adjustment is checked. The truck is then dismantled to the extent necessary to make needed repairs and adjustments and to renew worn and defective parts. Center plate is checked and lubricated and truck reassembled. There is then a final reinspection of all truck parts on the pit track to assure that all defects and irregularities have been corrected and that truck is properly assembled. After reinspection has been completed, the action of the truck is checked as the car moves along the track and through switches, to make sure that the truck performs properly.

Most frequent causes of poor riding are:

- Wheel defects such as worn flange, worn tread or shelled tread.
- Defective or improper springs.
- Too much lateral in journal box pedestal assembly.
- Improper adjustment of bolster anchor or equalizer alignment.

Questions and Answers

6-SL Brake Equipment

This is a new series of Questions and Answers pertaining to the 6-SL air brake equipment for switching locomotives. The references to the pamphlet, page and part numbers in the text indicates where the original material may be found in the manufacturer's technical publications and instruction pamphlets. Authorized persons may obtain a copy of Instruction Pamphlet Number 5046-15 which deals with this equipment by applying to the nearest district office of the Westinghouse Air Brake Company.

W70-Q—What arrangement on the D-24-B feed valve permits a finer graduation and how it is obtained?
A—The regulating valve actuated by pusher pin (34), located off center, opens with a tilting motion.

(Closed Position, Fig. 10)

W71-Q—What does this position show?
A—Shows the brake pipe pressure built up to the pressure setting established by the regulating portion.

W72-Q—What serves to hold regulating and supply valve closed?
A—They are held seated by their springs.

W73-Q—Describe the flow of main reservoir air in closed position.
A—Main reservoir air in chamber B beneath the supply piston flows through the strainer and choke in the piston to passage 30a and chamber D above the regulating valve. Further flow is cut off by the seated disc valve.

W74-Q—How is brake pipe pressure connected in closed position?
A—Delivered brake pipe pressure is connected through control passage 32 to chamber E on the face of the bellows. Brake pipe pressure is also connected to chamber P under they supply valve and through passage 21a to chamber H beneath the disc regulating valve.

W75-Q—Are the two chambers connected?
A—No. Chambers H and E are sealed off from each other permanently by a WABCO packing ring.

(Feed Valve Opening—Fig. 11
Pamphlet 5046-15, page 20)

W76-Q—What initial action takes place when a decrease in brake pipe pressure occurs?
A—The slightest decrease in brake pipe pressure is reflected through control passage 32 and chamber E on the bellows diaphragm, and as the bellows is very sensitive, it is deflected upward.

W77-Q—What happens when the bellows diaphragm is deflected upward?
A—Movement of the diaphragm causes the pusher pin to unhinge the disc regulating valve, tilting it from its seat.

W78-Q—With the regulating valve unseated, what takes place?
A—Main reservoir air in chamber D flows past the regulating valve to chamber H, passage 21a, and chamber P to passage 21 and brake pipe, reducing pressure in passage 30a and chamber A on the face of the supply piston, faster than it can be restored through the choke in the piston.

W79-Q—What results from this escape of air from the face of supply piston?
A—Higher main reservoir pressure in chamber B, beneath the piston, moves the piston upward, compressing supply piston spring and opening the supply valve (11).

W80-Q—What flow of air now takes place?
A—Main reservoir air flows directly from chamber B, past the supply valve to chamber P and brake pipe passage 21.

Feed Valve Re-Closing

W81-Q—What takes place as brake pipe pressure is restored?
A—Brake pipe pressure is quickly restored as reflected back through passage 32 to chamber E, and as it approaches the setting, it deflects the diaphragm downward.

W82-Q—What then happens?
A—The regulating valve spring seats the disc regulating valve permitting quick build up of main reservoir pressure in chamber A on the face of the supply piston. With equal pressures above and below the piston, its spring seats the supply valve, cutting off further flow of main reservoir air to the brake pipe.

(Distributing Valve Fig. 16)
(Pamphlet 5046-15, page 24)

W83-Q—What type of distributing valve is used with the basic No. 6-SL brake equipment?
A—The 6-KR distributing valve.

W84-Q—What portion is radically changed from the old type distributing valve?
A—The application portion. The 6-KR type incorporates a duplex-poppet type application valve instead of the slide valve formerly used.

W85-Q—Describe this arrangement and its operation.
A—Referring to Fig. 16: Application valve (68) and pilot valve (73) are operated by the piston to supply air from main reservoir to brake cylinder. During an application, the end of the application piston first unseats the pilot valve allowing air to flow to the brake cylinder.

(Pamphlet 5046-15, page 25)

W86-Q—What action takes place when the pilot valve is opened?
A—Opening of the pilot valve quickly lowers the pressure of air on the spring side of the application valve, inasmuch as the choke restricts the flow of air into this chamber.

W87-Q—What happens as this air pressure is lowered?
A—Main reservoir pressure acting on the outer area of valve (68), is able to partially overcome the spring tension and air pressure in the spring chamber, with the result that a small differential, acting on the application piston, opens application valve (68), permitting rapid flow of main reservoir air to the brake cylinder.

W88-Q—When do the pilot and application valves close?

A—When the required brake cylinder pressure is obtained, springs 75 and 76 promptly close the pilot and application valves and the application piston moves to Lap position.

(Pamphlet 5046-15, page 26)

W89-Q—What type of safety valve is used with the distributing valve?
A—The type "A" safety valve, Fig. 18.

W90-Q—Describe the adjustment of the safety valve.
A—To adjust the safety valve for the maximum or opening pressure (in this case 68 psi), remove cotter pin and nut, lock washer and shell, then remove the cap nut. Screw down or back-off the adjusting nut and replace the cap nut. The minimum or closing pressure is set by changing the size of ports Y using the throttling ring (7).

Air Gauges

(Pamphlet 5046-15, page 27)

W91-Q—What air gauges are used with this equipment?
A—There are two duplex air gauges, each of which has two pipe connections. One gauge is connected to the main reservoir (red hand) and equalizing reservoir (white hand). The other gauge is connected to the locomotive brake cylinders (red hand) and brake pipe (white hand).

General Motors

Diesel-Electric Locomotives

This is a new series of Questions and Answers pertaining to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

Placing Engine On the Line

G419-Q—When is the engine placed on the line and how is this accomplished?
A—After the oil pressure has built up, the engine is placed "on the line" by placing the Isolation switch in RUN position and can be done whether the engine is standing still or under power.

G420-Q—What precaution must be taken if the engine has been taken off the line for any reason?
A—Do not place it on the line if the locomotive is being operated in Dynamic Braking.

To Stop Engine

G421-Q—What are the various circumstances under which an engine may be stopped?
A—There are three ways: 1-Normal. 2-Under Power and 3-Emergency.

G422-Q—How is the engine stopped Normally?

(Manual 2310, page 208)

A—Normally stopping engine applies when the locomotive is standing still. In this case the Isolation Switch is placed in START position and the STOP button on the engine control panel is pressed in until the engine stops.

G423-Q—How is an engine stopped when under power?
A—To take an engine off the line when locomotive is under power or in dynamic braking, pull the engine layshaft closed until the engine stops.

G424-Q—What further action is required?
A—When the alarm bell starts ringing, place the isolation switch in the START position. When the engine stops place the fuel pump switch in OFF position.

G425-Q—What takes place in Emergency?
A—All engines are stopped in an emergency by depressing the STOP button on the end of the throttle lever and pushing the throttle lever as far forward as possible.

Securing Locomotive For Layover

G426-Q—What should be done with the transition and reverse levers in this case?
A—Place transition lever in OFF position. Place reverse lever in NEUTRAL and remove it.

G427-Q—What should be the position of the switches in push button control box and distribution panel?
A—They must all be opened after stopping engines.

G428-Q—What further precaution must be taken?
A—Set hand brakes and block the wheels.

G429-Q—What must always be observed before moving a locomotive under its own power?
A—Never move a locomotive under its own power, without having first observed proper application and release of the brake shoes.

G430-Q—What pressures should be checked?
A—Check the main reservoir and control air pressures.

G431-Q—What else should be done?
A—Release hand brakes and also observe that engine cooling water is 120 degrees or more.

Handling Light Locomotives

(Manual 2310, page 209)

G432-Q—With the engines placed on the line and cab preparation completed, what switch should be operated?
A—Push IN the generator field switch.

G433-Q—What should now be done with the reverse lever?
A—Insert and move to the desired direction.

G434-Q—When should the reverse lever be moved?
A—Only when the locomotive is standing still.

G435-Q—What other lever should now be operated?
A—The transition lever which must be moved to No. 1 position.

G436-Q—What should follow?
A—Depress Safety Control pedal (if used) and release the brakes.

G437-Q—How should the throttle be handled?
A—Open the throttle a notch at a time. Jerk throttle gently, one notch and release; this permits the lever to be reset for the next notch.

G438-Q—How must the throttle be, before coming to a dead stop?
A—In IDLE.

Questions and Answers

Fairbanks-Morse
Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

F378-Q—Describe the Pneumatic Control Switch (PCS).
A—An air pressure switch located at top of right hand nose equipment rack.

F379-Q—When does this switch open?
A—In the event of brake valve initiated emergency, safety control, overspeed or train control air brake application. When open it de-energizes the Pneumatic Control Relay (PCR).

F380-Q—How is the Pole Changer (Pole CH) connected?
A—Connected mechanically to the Cam Switch (used only on units equipped for Dynamic Braking).

F381-Q—When and how does the Pole Changer function?
A—When the Cam Switch is in braking position, the Pole Changer changes the traction motor blower motors from 4-pole to 2-pole operation to double blower speed. This furnishes necessary air to traction motors at low engine RPM.

F382-Q—How does the Reverse Current Relay (RC) function?
A—Opens Battery Charging Contactor (BC) when battery voltage exceeds auxiliary generator voltage.

F383-Q—Why is this done?
A—To prevent current from generator to battery from reversing.

F384-Q—How does the Shutter Magnet Valve (SMV) function?
A—Controls Main Reservoir air to the two shutter operating cylinders.

F385-Q—How is it energized?
A—By the Shutter Control Switch (TS)

F386-Q—What is the purpose of the Sanding Pressure Switch (SPS)?
A—Energizes forward and reverse sanding magnet valves (FSM or RSM) and train line wire SP (No. 12), closed by engineer's sanding switch or brake valve bail.

F387-Q—What is the purpose of the Signal Relay (SR)?
A—To energize alarm bells.

F388-Q—How does the Time Delay Relay (TDR) function?
A—Delays opening of power contactors (P-1 and P-2) until after excitation is removed, reducing contact tip burning.

(Bulletin 1706, Section 132A, page 10)

F389-Q—What is the purpose of the traction motor field shunting time delay relays (T1, T2, T3)?
A—To control timing of sequence in field shunting circuits.

Interchange Rules

194-Q—Inasmuch as the table in Section B of Rule 112 for per pound prices to be used in settlement for destroyed cars was modified in Supplement No. 1, effective August 1, 1955, to include a column covering per pound price for Class A flat cars only, what method is to be used hereafter insofar as flat cars other than Class A are concerned?
A—Per pound prices in the column of this table headed "All Others" should be used in settlement for all types of flat cars other than Class A.

[This question appeared on page 104 of the September 1955 issue. The interpretation of the rules was questioned by J. Demshock, supervisor car inspection, Southern, who expressed the opinion that the Interchange Rules would require such a car to be paid for at a price adjusted from its original cost. The point was raised in our January 1956 issue and has been clarified by the Secretary of the Mechanical Division, AAR.]

To the Editor:

At the time of submitting his comments, [Mr. Demshock] was not aware of certain action which had been taken at the March 1955 meeting of our Committee on Prices for Labor and Materials. This action in its entirety was as follows:

"Revised prices as shown in Report of Special Subcommittee, dated March 18, 1955 were approved for inclusion in the 1955 Report, with the following changes:

1. Recommend no changes in present prices for all classes of box cars.
2. Eliminate the column covering per pound prices for poultry cars as shown in the table of per pound prices under Paragraph 1 of Section B of Rule 112, with the understanding that on and after August 1, 1955, poultry cars destroyed on foreign roads shall be settled on the basis of the prices in the column of this table entitled 'All Others.'
3. Add new first column to this table in Rule 112 to be headed 'Flat', to cover Class A flat cars only at a per pound price of $.1275, it being understood that if there happen to be any other classes of flat cars still in service and same should happen to become destroyed on foreign roads settlement would be on the basis of the column 'All Others'."

The ruling contained in the above action, of course, is the basis for the answer used under question No. 194. After reviewing the action by the Price Committee [Mr. Demshock] assured me that he is entirely satisfied with the answer and the question which you published.

FRED PERONTO
Secretary, Mechanical Division, AAR

and Adjustable Locks

ADAPTABLE TO ALL DROP BOTTOM GONDOLAS

Wine Drop Bottom Locks and Spring Hinges have long been established as the practical method for drop bottom closure. Basic simplicity and ruggedness of the mechanism requires little or no servicing, and the accessible method of adjustment on the individual lock assures positive door fit.

Featuring single door operation, any or all doors open as required to control lading distribution. Maintenance-wise, a single door and mechanism may be dismantled without disturbing adjacent doors. The Wine Drop Bottom Combination offers all the important improvements — individual door fit, minimum maintenance, and easy, one man selective operation.

THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO

1956 INTERCHANGE RULES . . .

(*Continued from page 80*)

to provide that secondhand draft gears which have been reconditioned and marked (RP-XYZ-1-56) as required in Specification M-901-B of the Manual of Standard and Recommended Practice shall be charged at 75 per cent of price new complete. Any which have not been reconditioned and so marked shall be charged at 55% of price new complete which means a zero net material charge because credit for the gear removed is also 55%.

Section 1-A: New Item 250-S has been added to provide price for Cardwell L-20-S-1, 15⅝-in. draft gear for 17½-in. pocket.

Brake Beam Identification Table, Figure 2 No. 18 Beams on Page 231 now include certificates 58 and 79 (hanger types) and certificate 80 (hangerless type). The 58 is Schaefer and 79 and 80 are Boxweld.

AAR Approved Types of Geared Hand Brakes. The table on pages 237 and 238 was modified to show "Active" and "Obsolete" types separately and four new types were added to the active horizontal wheel types. All seven notes under present vertical wheel type list are eliminated because revision of table makes them unnecessary.

List of Packing Retainer Devices on page 243 the long type Hold-Rite retainer has been added to the list and a new fourth note added regarding its use reads, "Hold-Rite long spring type packing retainers, Drawing P14-4-8000, may also be applied to 5½-in. x 10-in. size journal boxes of separable bolted type not having waste retaining ribs cast integral. When car is so equipped, fit must be maintained in kind."

Rule 104

Section (L) Items 20 to 26 inclusive were eliminated because items of K type air brake material deleted from Rule 101 are seldom used and new note was added to that rule preceding item 1 specifying use of 1955 prices.

Rule 107

Labor Charges: seventh paragraph of preamble modified to show that the cost of health and welfare benefits are included along with all other overhead expenses in labor rates per hour and labor charges in this rule as well as in Rules 101, 111, and PC Rules 21 and 22.

AAR freight car labor rate has been increased to $3.80 per hour effective February 1, 1956. This was due to the recent award of 14.5 cents per hour and an increase of one per cent in unemployment insurance tax.

Rule 111

Air Brake Repairs: Items 13, 14, 15 & 15-A charges modified with increased material prices in Rule 101.

Rule 112

Settlement for Destroyed and Badly Damaged Cars: Section A, Paragraph 1-d-2 on page 276 was modified to clarify the intent that charge for renewing missing truck or trucks of cars sent home loaded on another car or cars should be on basis of *new or* secondhand material applied, in cases where cost of repairs to remainder of the car does not exceed the AAR depreciated value of the entire car less net salvage. This shows the importance of locating, identifying and holding the trucks of such cars.

Form C: AAR Record of Rebuilt Car on page 290 was changed. "Trucks, long travel springs" added to conform to Section (t-l-c) of Rule 3, which requires such springs and snubbing arrangements on all cars built new or rebuilt on and after January 1, 1956, except flat and gondola cars of special construction.

Rule 122

In cases where material is furnished to foreign roads in exchange for defect cards, generally at interchange points, to expedite repairs to system or foreign cars, billing forms showing car number, material, pattern number, etc. should be prepared in triplicate and all papers sent to billing office. For material which is obtained, the thin copy of the defect card should be attached to the billing repair card before forwarding to the billing office, and show road from which obtained.

PASSENGER CAR RULES

Rule 2

Section (j) Pitt type couplers had the effective date from owner extended to January 1, 1957 at which time note was added, "Cars on which the MT high tensile steel coupler has been substituted for Pitt type couplers are acceptable in interchange."

Rule 7

Paragraph (e-4) A new second note added to indicate that new Paragraph 171 (b) and modified Rule 355 (c) of the Wheel and Axle Manual govern the turning of axles for AAR standard controlled clearance journal bearings.

Section (L-2): New Second Note was added "Journal boxes may be given periodic attention prior to expiration period, by 10 days for roller bearings, and 15 days for solid type bearings regardless of whether or not car requires other repairs."

Rule 15

Fourth paragraph was modified to indicate that Freight Rule 66, Section (k), governs the selection of proper journal bearings for application in connection with AAR standard controlled journal bearing clearances effective March 1, 1956.

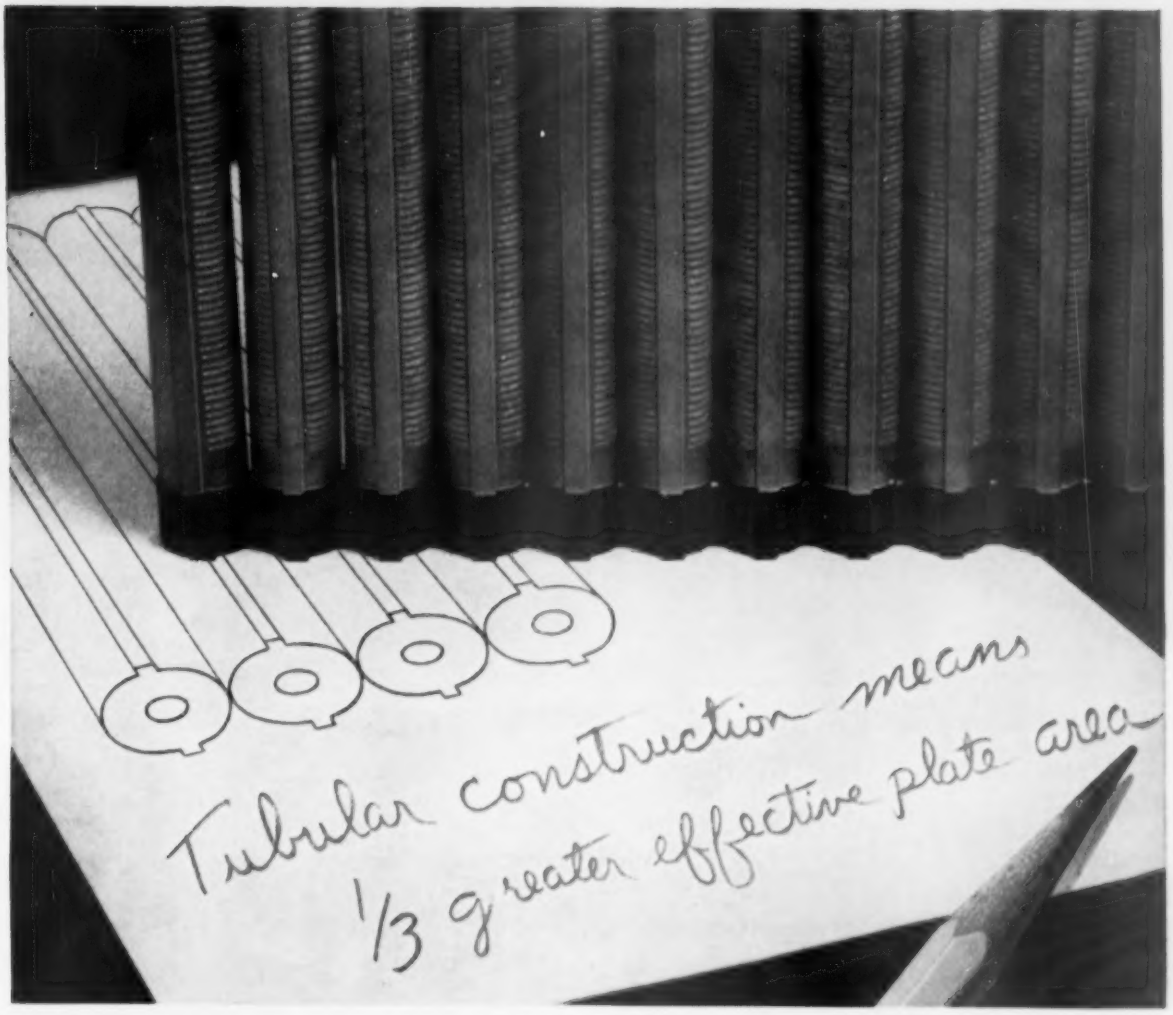
Rule 21

When changing roller bearing wheels, Freight Rule 9 states "the make and car owners serial number must be shown separately for each roller bearing if indicated by stamp or tag on the journal box. If car owner has not assigned a serial number to his journal roller bearing box assemblies, the billing repair card should bear notation 'No owners serial number' after the make of the bearing." If Spicer drive is involved, show serial number in column provided for axle center diameter.

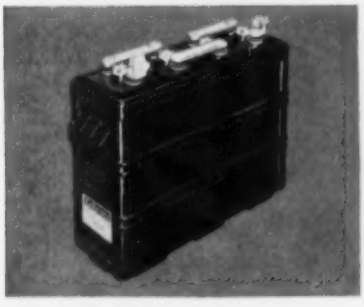
Rule 22

Material charges were adjusted in line with recent quotations resulting in an increase on numerous items. Where stores department cost is chargeable, show the price, account and reference numbers on record repair card only.

EXIDE-IRONCLAD BATTERIES



Greater effective plate area boosts power for peak loads



BATTERY FOR RAILWAY DIESEL STARTING. Model MV-D. Its tubular construction provides for extra reservoirs of electrolyte adjacent to positive plate. Battery better able to supply sudden heavy power drafts to turn over starting motors. Extra heavy connectors offer minimum resistance to heavy currents. Write for Bulletin 5348.

According to general principles of storage battery engineering, power reserve is governed by positive plate area. In the Exide-Ironclad greater effective plate area is achieved without increasing plate size. Here's how:

In the Exide-Ironclad positive plate, active material is held captive in tubes of slotted polyethylene. These tubes are arranged in a tight row with electrical connections only at the top. The actual surface of the plate is the combined semicircular sides of these tubes—the total surface area being roughly one-third more than the projected dimensions of the plate.

In use, this unique design feature means that more active material is exposed to electrolyte for a given size battery. It means the battery can provide power to spare for peak loads as well as a dependable source of continuous power.

Only Exide-Ironclad Batteries have this advantage. Be sure to specify them when you order—for either new equipment or for replacement. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®

This machine for excavating intertrack ballast is only one of the many different types of track maintenance equipment lubricated with ESSO MULTI-PURPOSE GREASE.

One grease for many uses—
ESSO MULTI-PURPOSE GREASE simplifies maintenance

For all types of maintenance-of-way equipment . . . ESSO MULTI-PURPOSE GREASE. It is an ideal lubricant for such diverse equipment as ballast cleaners, tampers, cribbers, screeners and many other pieces of machinery, including automotive and construction equipment. The use of *one* grease instead of many is more efficient, more economical. Because of these benefits, more and more railroads have come to use and depend on ESSO MULTI-PURPOSE GREASE.

THREE IMPORTANT ADVANTAGES back the use of ESSO MULTI-PURPOSE GREASE:

1. Outstanding in quality, it has been proved on the road and in the lab in a multitude of applications. Meeting the rigid requirements for automotive wheel bearings, it performs equally well in applications requiring a general purpose grease.
2. ONE grease performs in many applications, eliminating the need for a variety of greases. It prevents the application of the wrong grease and possible damage to machinery.
3. Storage and handling problems are reduced to a minimum, resulting in greater economy. It is easier to protect a single container of ESSO MULTI-PURPOSE GREASE against contamination than several partially empty special-purpose drums.

Esso

RAILROAD PRODUCTS

Valuable years of experience in research and development, along with continual testing on the road and in the lab, stand back of the outstanding performance of famous Esso Railroad Products.

EQUIPMENT

(Continued from page 10)

gauge. *Minneapolis-Honeywell Regulator Company, 2753 Fourth avenue south, Minneapolis 8.*

Diaphragm Material

Dynel diaphragms use an impregnated synthetic fiber and have now seen two years of road service on passenger cars. One railroad is using them for replacements both on passenger cars and diesel locomotive units. Dynel is a high-strength synthetic fiber material which resists mildew and, according to a railroad user, has "excellent fireproof and waterproof qualities." The material is said to retain its fireproof qualities longer than other materials and suffers no adverse effects from extreme temperature changes. Strong detergents used in locomotive and passenger car cleaning have little effect. *Textile Fibers Department, Carbide & Carbon Chemicals Co., 30 East 42nd street, New York 17.*

Car Lining

Glid-Iron, a 100 per cent solids resin coating, has been field-tested by several railroads in maintaining and upgrading freight car floors and walls. It offers substantial maintenance savings with a Glid-Iron upgrading cost estimated at $60 to $75, for a 10 x 40-ft freight car floor area.

Glid-Iron may be applied by spray, brush, roller or squeegee in any mil thickness, and from $\frac{1}{16}$ to $\frac{1}{2}$ in. Application time is 20 to 30 min with an undercoating gun and two to four man hours by other methods. The new coating is capable of smoothing out and bridging small cracks. It adheres to wood and primed metal, setting to a hard, tough, flexible and scuff resistant finish after curing overnight at normal room temperatures.

The product is outstandingly resistant to shock and impact, showing no adverse effects from the extremely heavy weights and rough abuse brought about through the use of materials handling lift trucks and other such mechanized equipment.

Glidden research technicians report Glid-Iron will withstand extreme temperature ranges—from 20 deg below *zero* up to 212 deg F. The floor coating is skid-proof even when wet with rain or snow, and nails may be driven through the film without its chipping. Glid-Iron may be had in any color. *Glidden Company, Cleveland.*

ONE OF THE GARLOCK 2,000

...WITH GARLOCK 662 GASKET MATERIAL...

cuts easily, and gaskets will not change shape or shrink in storage under varying climatic conditions. Made from a cork paper base impregnated with a synthetic rubber, style No. 662 resists gasoline, oil and water . . . withstands temperatures up to 300° F. It's ideal for cutting emergency gaskets that you can depend upon. GARLOCK 662 is approved by Underwriters' Laboratories, Inc., for use against hazardous liquids, such as gasoline, naphtha, benzine, fuel oils, etc.

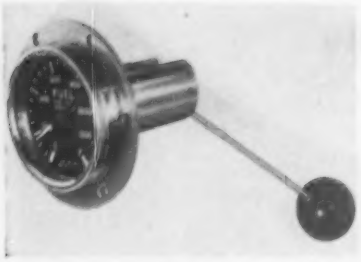
And, longer-lasting 662 Gasket material is only one of "the GARLOCK 2,000" . . . two thousand different styles of gaskets, packings, and seals to meet all your needs . . . The *only* complete line available. That's why you get *unbiased* recommendations from your GARLOCK representative. Call him today, or write for Bulletin AD 146.

THE GARLOCK PACKING COMPANY,
Palmyra, New York

For Prompt Service, contact one of the 30 sales offices and warehouses throughout the U. S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints



Tank Level Gage

A dial type gage, the D6, permits instant direct reading of railroad tank contents. The gage is designed for fuel or water gaging on diesel locomotives, passenger cars and mechanical refrigerator cars. It is said to offer improved reading over sight gages where fuel oil stains on the glass obscure accurate indication. Fluorescent dials on the D6 facilitate night readings.

Dial indication on the D6 is effected by float actuation and direct mechanical linkage through a special bellows seal. This seal is designed to eliminate fuel and vapor leakage into the dial. There is said to be little possibility of fuel loss and fire hazard is reduced. Calibrated in gallons, the gage can be used to gage any size or shape fuel or water tank. The gage float is made of solid synthetic material and is both water and fuel proof. *Liquidometer Corporation, 36th street and Skillman avenue, Long Island City 1, N.Y.*

JBS CHENILLE ROLL PACKING

A.A.R. approved for use in interchange

- Improves lubrication
- Reduces hot box causes
- Boxes quickly and easily repacked
- The most economical lubricator

Available in cotton or wool-cotton yarns. Withstands hard service and is RECLAIMABLE.

Serving the railroads for more than 25 years and ready for continued service in 1956

JOURNAL BOX SERVICING CORPORATION
332 South Michigan Avenue, Chicago 4, Illinois

This famous BRASS TRIMMER

saves thousands of dollars a year! Used at periodical re-packing time, the trimmer perfectly restores the oil grooves of journal bearings. EASY TO USE. The most inexperienced man may perform the job at carside within three minutes.

BEARINGS BETTER THAN NEW! Trimming and reapplication to the journals from which removed result in PERFECTLY FITTED BEARINGS and eliminate the hazard of failure during the otherwise crucial break-in period of a new bearing. Many years of service verify savings of $5.00 and more per car.

Rent or buy

The A.A.R. has approved trimming of bearings as a chargeable item on cars in interchange.

Battery Cell Filler

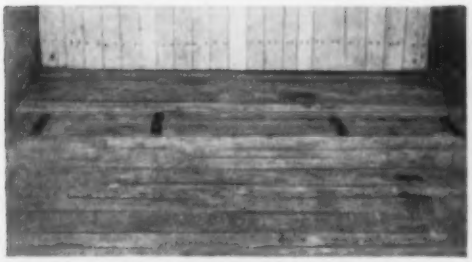
The "Rite-Hite" cell filler is a lightweight, rugged tool for adding water to battery cells without overfilling. It may also be used to open hinged vent caps making it unnecessary for the operator to reach into the battery box. The filler has a long tube to permit reaching all vent caps and has an hydrostatic means of controlling the flow. The end of the tube is inserted in the cell opening and water flows from the source through the cell filler until the end of the tube in the cell is submerged. Hydrostatic pressure cuts off the flow automatically when the electrolyte reaches the correct height as determined by the length of the nozzle on the end of the tube. No current or electric light bulbs are used. The only moving parts are a spring valve and a diaphragm. Static pressures above 20 psi and below 60 psi are necessary. For pressures above 60 psi, a restrictor is required in the inlet. The cell filler can also be used to wash off the top of battery cells by operating the tool manually with a lever beneath the handle. *Gould-National Batteries, Inc., Trenton, N.J.*

Spray Booth Paint Heater

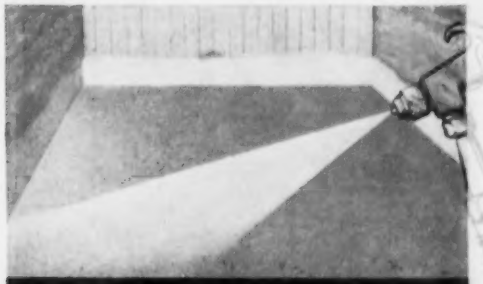
The latest model DeVilbiss traveling spray booth incorporates the DeVilbiss paint heater which has had a wide acceptance in industrial plants. One has been delivered to the Norfolk & Western at Portsmouth, Ohio. The addition of the paint heater will make it possible to use lower atomization pressures, reducing overspray and waste. The heater reduces the viscosity of paint materials and gives greater hiding power since more solid is applied to a given area. With this greater hiding power achieved through better film

(Continued on page 104)

Now...



BEFORE ▼ AFTER



UPGRADES ANY CAR INTERIOR TO MEET HIGH TARIFF LADING REQUIREMENTS

- **SMOOTH, TOUGH SURFACE—EASILY SWEPT OR WASHED OUT**
- **ADHERENT**—a mastic which bonds to surface. Not a strippable material
- **FLEXIBLE**—tough, but not brittle. ⅛" film will bend around 1" mandrel
- **SOLVENT RESISTANT**—unaffected by mineral spirits, water or gasoline. Wood color of film will not stain or discolor
- **NON-HAZARDOUS**—an oil-in-water emulsion. Presents no fire hazard in storage or application.
- **INSECT RESISTANT**—made of synthetic resin and mineral fillers—absolutely impervious to insects.

A PROTECTIVE COATING

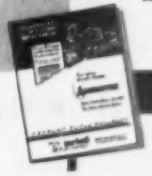
FOR BOX CAR INTERIORS THAT LASTS INDEFINITELY

ARMORTEX

Here's really big news the whole railroad industry has been waiting for! Now, for the first time, it is possible to apply a quick, economical protective coating to box car floors and walls which insures the *permanent*, superior surface needed for shipment of high grade bulk commodities such as grits, flour, sugar and grain.

Armortex, an amazing new discovery of the J. W. Mortell Railroad Division, completely eliminates the costly preparation of cars for individual loadings. Internal car surfaces coated with Armortex no longer splinter or deteriorate under normal operating conditions . . . thus resulting in a reduction of claims due to leakage, infestations, package damage.

Still another big advantage of new Armortex is its ease of application. One man can cover a box car floor in less than 30 minutes . . . readying the car for service the next day. By spraying, brushing or troweling, Armortex can be applied at any shop, rip-track or siding without returning the car to a central maintenance location.



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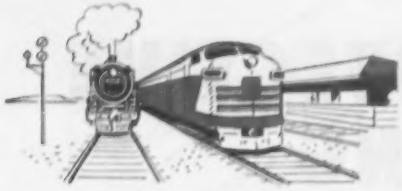
A MILLION MILES

Between Shoppings with EX-CELL-O Pins and Bushings



The longer wear from Ex-Cell-O hardened and ground steel pins and bushings means trouble-free service for your equipment — often over a million miles between shoppings. That's why more than 200 American railroads and equipment builders use Ex-Cell-O pins and bushings. Get long-run economy for your Diesel, steam, and passenger car equipment by standardizing now on Ex-Cell-O railroad pins and bushings.

For a complete listing of standard styles and sizes write today for new Ex-Cell-O Bulletin 32559.

RAILROAD DIVISION

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

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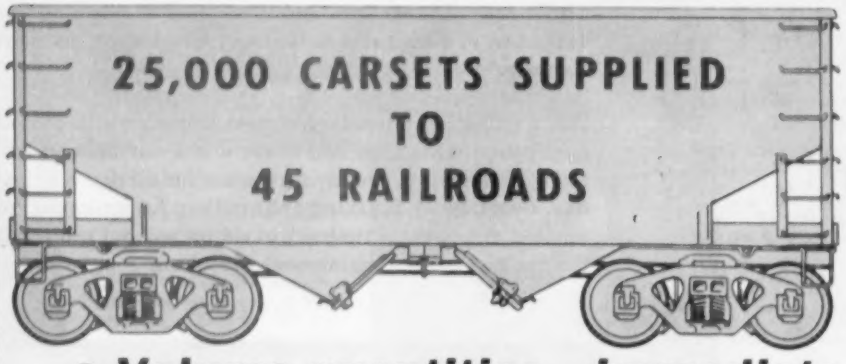
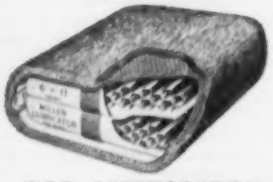
For Progressive Railroading



MILLER

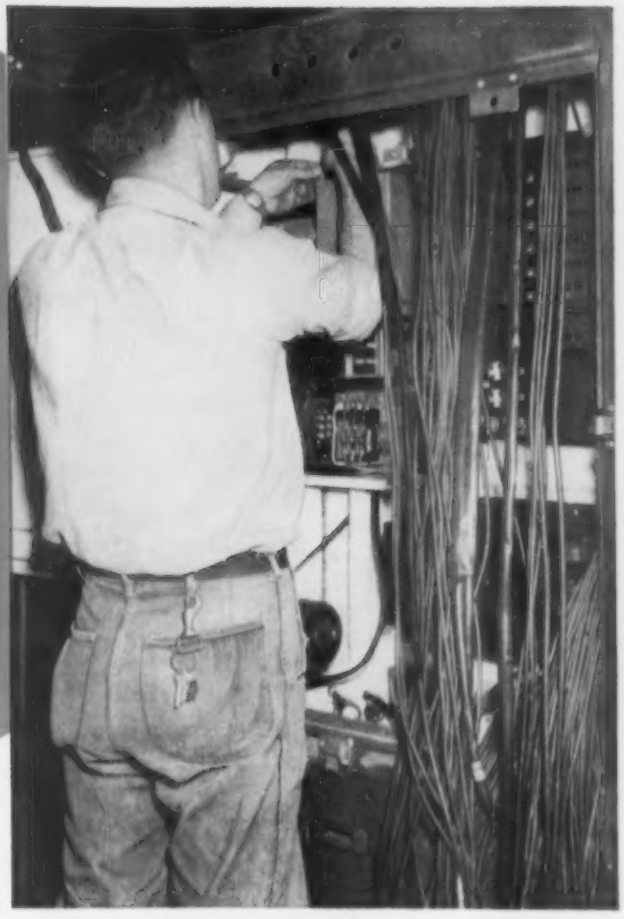


PAD LUBRICATOR

- ***Volume quantities—immediate delivery***
- ***Cost—$40 per carset*** **(for all sizes)**
- ***Life expectancy—6 years***

MILLER LUBRICATOR CO., WINONA, MINN.

How to make more passengers ride more often



The more comfortable you make your passengers, the more passengers you will have to make comfortable. The word gets around fast about comfortable, pleasant, train trips. Dependably-operating, comfort-producing equipment like air-conditioning and lighting go a long way towards making train trips enjoyable.

Simplex Car Wire, shown above being installed in a new railroad passenger coach, helps keep this equipment functioning reliably. Able to withstand vibration, and resistant to abrasion, heat, oils, and moisture, Simplex Car Wire is very long-lived.

Its small size and light weight make it especially easy to handle and install. Simplex Car Wire is insulated with a special rubber insulating compound that retains its physical and electrical properties even in wet and/or hot locations. A tough neoprene jacket provides additional protection.

To learn more about how Simplex Car Wire can help you make more passengers more comfortable, by assuring dependable operation of air-conditioning and lighting, write to the Railroad Department at the address below.

Simplex CAR WIRE

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

THEY HELP KEEP
DIESEL-ELECTRICS ROLLING
...profitably!

When you use Stackpole brushes, you have maximum assurance that there won't be extra "time out" for costly commutator reconditioning beyond the usual 300,000-mile overhauls.

Stackpole brushes eat up the miles . . . but NOT the commutators!

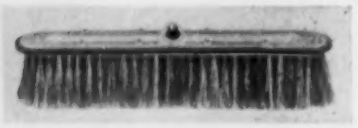
STACKPOLE CARBON COMPANY
St. Marys, Pa.

STACKPOLE
diesel electric
BRUSHES

BETTER BRUSHES FOR ALL ROTATING ELECTRICAL EQUIPMENT
ELECTRICAL CONTACTS • CARBON-GRAPHITE BEARINGS • CLUTCH RINGS • SEAL RINGS • TROLLEY AND PANTAGRAPH SHOES • WELDING CARBONS • RAIL BONDING MOLDS • VOLTAGE REGULATOR DISCS • FRICTION SEGMENTS • RESISTANCE WELDING AND BRAZING TIPS • HIGH PURITY CARBON • ELECTRIC FURNACE HEATING ELEMENTS . . . and dozens of other carbon, graphite and molded powder products.

(Continued from page 100)

build, the number of coats required is reduced and better protection for the surface is the result. The N&W booth has automatic spray guns and three paint circulating systems to handle primer, black paint and red paint. *DeVilbiss Company, 300 Phillips avenue, Toledo 1, Ohio.*



Fountain Brush

This fountain brush, No. 116, with long-wearing nylon bristles, is said to greatly simplify the exterior cleaning of railway cars. Its brush head measures 2¾ by 16½ in. Bristles, 2¾ in. long, are supplied in 100 per cent Dupont Tynex nylon or in 50 per cent nylon and 50 per cent horsehair.

No extra equipment is needed to use the brush, just connect the water hose to the brush handle. Water is delivered through the bristles to the surface being washed. Washing and flushing are accomplished in the same operation. Ten bolts hold the brush element securely to the head. Both are cast aluminum. The brush element is replaceable or refillable. The head is surrounded by a rubber bumper. Weight of brush is 2 lb 6 oz, less handle. *K. C. Fountain Brush Company, 3714 Main street, Kansas City, Mo.*

Bar Clamp

The Quickcet bar clamp, for welders and machine tool shops, has been designed to hold small or large objects formerly too bulky to handle. The ¾-in. device with sliding jaw for quick adjustments can be used either vertically or horizontally.

The unit, of alloy steel, has been proof tested to 4,500 lb. It weighs 8 lb and has a 15-in. opening capacity with its standard 12-in. pipe bar. Extra lengths can be furnished. *Grand Specialties Company, Dept PC, 3101 West Grand avenue, Chicago 22.*

Coil Winder Drive

This 3-speed bench winder intended for various types of winding applications, incorporates many features found in larger models. Speed adjustments are obtained by means of three speed pulleys on the motor in the gear box. This gear arrangement is designed for smooth operation and constant torque with no back lash. The clutch and brake are controlled in one operation.

A standard type lathe plate is adaptable to all types of winding heads. The face plate shaft is tapped to take a standard ½ in. outside diameter bolt for special winding applications where small cores are to be used, such as solenoid, electromagnet coils where random or layer winding is necessary.

The unit will accommodate a 40 lb load

(Continued on page 108)

ORIGINAL WOOD ENGRAVING BY B. BRUSSEL-SMITH

confidence . . . and the X-2 wheel

An overwhelming vote of confidence has been cast for our new AAR X-2 steel wheel—over *fifty* railroad customers have ordered more than 100,000 of these 1.5% carbon wheels in the first brief year of commercial production.

Behind this acceptance of the Southern® cast steel wheel are eight years and nearly six million car-miles of road service. Not one wheel failure has occurred.

On such records of performance is true confidence built.

SOUTHERN WHEEL DIVISION

AMERICAN Brake Shoe COMPANY

230 PARK AVENUE, NEW YORK 17, N. Y.

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PRODUCTION TOOLS by APEX

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For Tooling Economy Use APEX Inserted Tools For Axles

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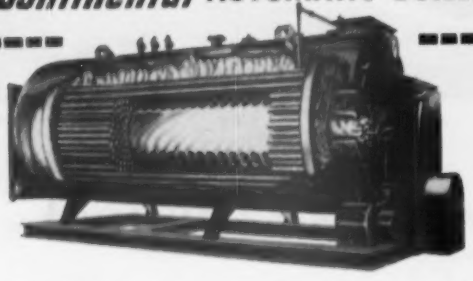
← HOLDERS AND TOOLS for "SELLERS" AXLE LATHE

We manufacture holders and forged inserted tools for roughing and finishing axles and wheels. Form tools to your specifications. Send for book on APEX tooling for railroad work, or the the APEX catalog. Our engineers are always ready to help you with tooling problems.

See Them At APEX Booth 174 ASTE EXPO. Chicago March 19 - 23

THE APEX TOOL & CUTTER CO., SHELTON 22, CONN.

Why it COSTS LESS to Buy and Keep a Continental AUTOMATIC BOILER



Continental Boilers are frequently *lowest* in purchase cost, and Continental Radiant Flame Heating meets or beats other methods of combustion for fast, economical heat. Being baffleless, Continental Boilers are lighter—thus are less costly to ship, easier to install. Many maintenance "sore spots" are eliminated because of uniform longitudinal expansion and absence of baffles. Hinged front and rear doors cut shutdown time to a minimum.

Sizes 20 to 500 hp; 15 to 250 psi. Gas, oil or combination fired. Write for Bulletin.

Continental AUTOMATIC BOILERS

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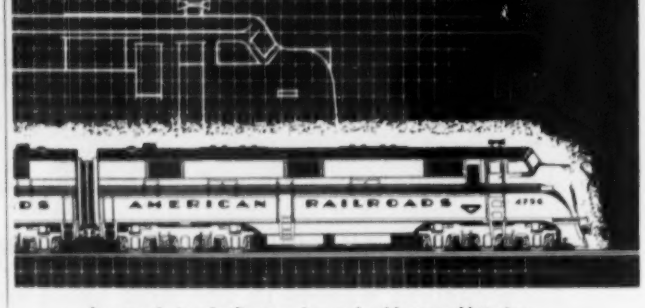
it's a proven fact

TIME AND MONEY ARE BEING SAVED BY USERS OF DEMP-NOCK

SPRAY IT - STENCILS



. . for reproducing the finest and most durable type of lettering plus designs by the spray-gun method on locomotives, passenger cars and other types of equipment . . accepted and used today by 1/3rd of the major railroads . . let us prove this to you.

WIRE OR WRITE RAILWAY SALES DEPARTMENT

THE DEMP-NOCK CO.

DEMP NOCK

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Boston • Chicago • Philadelphia • St. Louis • San Francisco • Washington, D. C.

What about *WASTE?*

The case FOR and AGAINST waste in railway journal lubrication

AGAINST

1. Loose waste is a frequent cause of waste-grabs.
2. Loose waste works out from under journal collar.

FOR

1. When waste is held in a Plypak waste container, waste-grabs are eliminated.
2. Waste has the most satisfactory capilliary action for maintained journal lubrication.
3. Thru the pumping action of Plypak, waste held in Plypak stays clean . . . does not glaze. Dirt and dirty oil settle below the Plypak.
4. With waste, there is nothing to wear and tear. Oil does not slosh out around the dust guard.
5. Waste packed in Plypak provides lasting lubrication, as evidenced by the 36 months repacking period with Plypak approved (on request) by the A.A.R. Money saving pays for the Plypak by the second repack period.
6. Plypaks require 40% less waste.
7. Packing waste in Plypak reduces Hot Boxes by more than 80%.
8. *There is nothing experimental about Plypak.* It has been proved in more than five years of service. Over 200,000 Plypaks are now in use.

For the most satisfactory and trouble-free journal lubrication, specify Plypak waste container and retainer.

WAUGH EQUIPMENT COMPANY

New York, Chicago, St. Louis. Canadian Waugh Equipment Company, Ltd., Montreal

INDUSTRIAL HOSE AND FITTINGS

Super resistance to abrasion and corrosion makes this hose excellent for railroads, road equipment, farm machinery, and materials handling equipment. High tensile strength single wire braid. Tough synthetic rubber cover. Working pressures to 2500 psi. Bulk hose and fittings . . . complete hose assemblies at your dealer.

Write for BULLETIN
Dealerships open in some areas.

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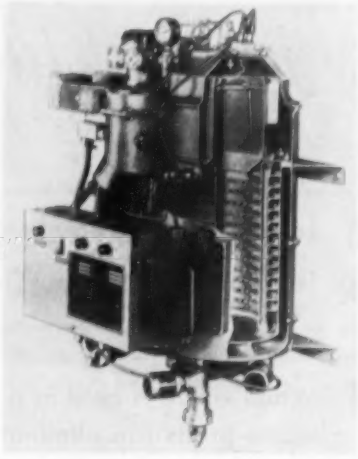
STRATOFLEX, INC. FORT WORTH, TEXAS
P. O. BOX 10398

BRANCH PLANTS
LOS ANGELES AND TORONTO
SALES OFFICES
ATLANTA • CHICAGO • NEW YORK • SAN FRANCISCO
DAYTON • HOUSTON • KANSAS CITY • PORTLAND • TULSA
IN CANADA
STRATOFLEX OF CANADA, INC. TORONTO 18, ONTARIO

(Continued from page 104)

on the face plate at top speed of 360 rpm. Designated Model 2050, it operates on 120 volts, 50-60 cycles with a ⅓ hp motor. Speeds are 95, 200 and 360 rpm with torques of 12, 8 and 5 ft lb. Weight with motor is 60 lb and overall height is 19 in., with a width of 11 in. and a depth of 9½ in. The unit includes a five digit automatic counter. *Crown Industrial Products Company, 1177 Amsterdam street, Woodstock, Ill.*



Coach Heaters

In one of the side compartments under each of the ten passenger cars in both of the GM Aerotrains is a vapor automatic oil-fired hot water heater No. 4915. Thermostat controls cause the heaters to turn ON and OFF as needed to supply additional heat to keep the cars warm on cold winter days or whenever more heat is needed than is supplied by the electric immersion heaters in the liquid heating system in the cars. These automatic Vapor hot water heaters put out from 125,000 to 150,000 btu per hour. They were developed to keep the diesel locomotive engines warm during over night non-operating hours.

The heaters have a high output, enough to fit into small compartments. The forced draft fire burns in an Inconel firepot. A fuel pump, forced draft motor and all the automatic controls are incorporated into this small package. *Vapor Heating Corporation, 6420 West Howard street, Chicago 31.*

Corrosion Resistant Neoprene Coatings

A total of 1,200 box cars procured by the Southern are lined to a height of 4 ft with ¼-in. steel plate to protect walls against mechanical abuse. To protect these plates from corrosion, GACO N-700 liquid neoprene coating is being used.

The manufacturer says the coating makes a firm bond with steel, has excellent resistance to weathering, and will not crack, chip or soften. The coatings are applied in uniform thicknesses with a brush or roller. The formulations are available in gray, slate black, red and aluminum. On-the-spot repairs to any damaged Neoprene can be made quickly and easily as required. *Gates Engineering Company, 100 S. West street, Wilmington 99, Del.*

Iron Powder Electrode

An iron powder type electrode, Jet-Hard BU-90, especially for maintenance and repair welding, is for fast build-up of worn parts at low cost. It produces a medium carbon, medium alloy deposit for building up worn parts with a dense, moderately hard, tough machinable surface to resist shock and abrasion.

The high deposition rate results in a 35 to 45 per cent increase in the amount of metal deposited per minute when compared with conventional build-up electrodes. Slag is practically self-removing. The arc is smooth with minimum spatter and is easy to control. Chromium carbide in the deposit produces abrasion resistance 25 to 50 per cent greater than that of deposits made with conventional high carbon build-up electrodes. Impact resistance and toughness is increased by both chromium and manganese in the deposit. Deposits made with normal procedures are machinable

(Continued on page 112)

Proved by USE!

Works in seconds! Loosens Rusted Bolts
nuts, screws, "frozen" parts
. . . . without breakage!

LIQUID WRENCH

A powerful blend of quick-acting solvents that frees "frozen" parts without breakage. Safe for all metals and alloys.

Makes joints LEAKPROOF!

7 BASIC BLENDS

TiteSeal
GASKET & JOINT SEALING COMPOUND

Makes all assemblies leakproof and pressure-tight. Easy to apply with brush-in-handle.

- NON-SOLVENT—WILL NOT HARDEN
- WILL NOT SHRINK, CRACK OR CRUMBLE
- HEATPROOF AND VIBRATION-PROOF

Get them from your Automotive, Hardware or Plumbing Wholesaler!

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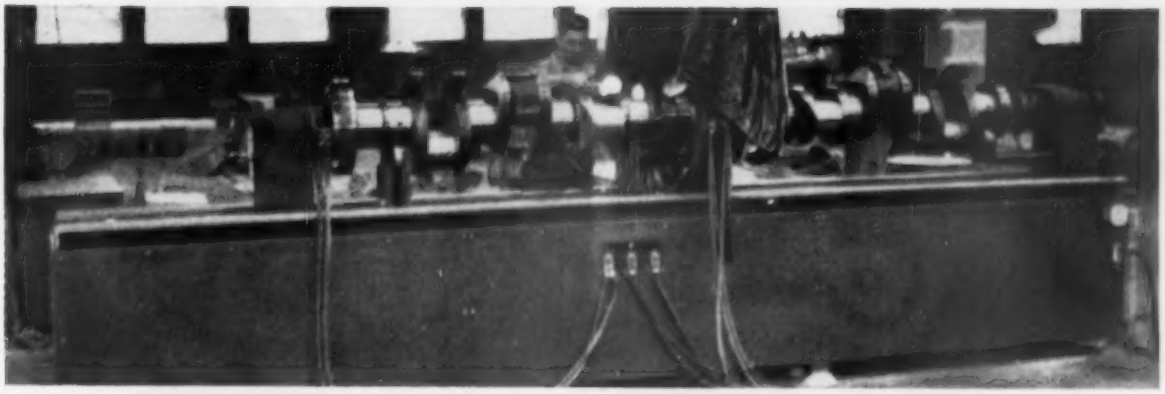
Charlotte, North Carolina



Diesel crankshaft inspection with a Magnaglo RC-1925 unit at the NEW YORK CENTRAL Diesel Shop in Collinwood, Ohio.

Diesels are Different—

to find cracks in **precision** parts, you need **precision** testing equipment **designed for the job**

Zyglo ZA-37 unit in use for rapid and reliable testing of Diesel valves during overhaul—to find any cracks from service.

Magnaglo DRC unit—maximum sensitivity in inspection of pistons, rods, pins, gears, injectors, etc. Fast, low cost inspection for shops where any Diesel work is done.

● With Diesels, you must inspect many more precision parts for cracks than you ever had with steam. For example, cracks are serious in pistons, piston carriers, rocker arms, injectors, connecting rods, crankshafts and others. In any of these parts, cracks may mean road failure, high-cost unscheduled repair, severe damage.

Magnaflux* designs and builds the equipment used by most railroads to find *all* cracks in every working part in a Diesel. Fast, cheap-to-use, and nondestructive, this equipment meets the testing need in each kind of Diesel shop.

THE MAGNAGLO* RC-1925

For major Diesel shops, this unit provides fast low cost inspection of all working parts made of magnetic metal—no matter how big. Crankshafts, axles, and other major parts get quick, positive crack detection that cuts the time and cost of *safe* overhaul. Any small part is easily tested, too.

THE NEW ZYGLO* ZA-37

Makes certain that no cracked exhaust valves, aluminum pistons, or other nonmagnetic parts will get back into service because of "the crack that couldn't be found."

MAGNAGLO* DRC-543

The ideal unit for "topping" inspection in turn-around shops where Diesels must be back on the road in the shortest possible time. Offers maximum sensitivity in fast inspection of pistons, heads, rods, pins, gears, injectors, etc.

Magnaglo and Zyglo units *for railroads* are *built* for railroads. Marking every crack with a glowing fluorescent line, they are the only equipment giving positive detection of crack-type defects, with least man hours. They are recommended by railroad authorities as the "standard" accepted test for crack-type defects.

Write today for free interesting bulletins and technical reports telling how railroads are using Magnaflux* testing methods to increase the dependability and availability of their Diesels. No obligation, of course.

*Magnaflux, Magnaglo and Zyglo are registered trademarks of Magnaflux Corporation.

MAGNAFLUX CORPORATION
7320 West Lawrence Avenue • Chicago 31, Illinois
New York 36 • Pittsburgh 36 • Cleveland 15
Detroit 11 • Dallas 19 • Los Angeles 58

MAGNAFLUX

. . . guards perishables under ALL conditions!

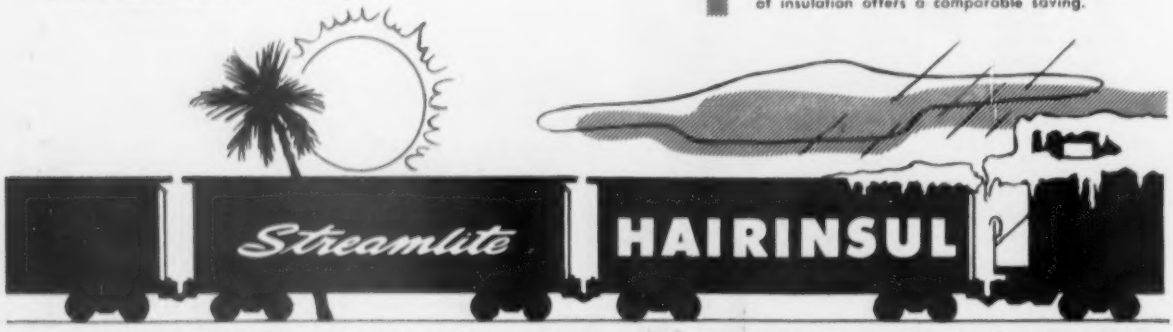
Major refrigerator car builders have been using all-hair insulation for nearly half a century — and today they specify Streamlite HAIRINSUL because of its 40% less weight, higher efficiency and greater economy.

At any location, at any temperature Streamlite HAIRINSUL provides maximum protection to valuable shipments of perishables.

Yes, Streamlite HAIRINSUL assures you all the major advantages listed at the right — and more besides. Write for complete data.

AMERICAN HAIR & FELT COMPANY
Merchandise Mart • Chicago, Illinois

- **LOW CONDUCTIVITY** — Thoroughly washed and sterilized, all-hair heat barrier. Rated conductivity — .25 btu per square foot, per hour, per degree F., per inch thick.
- **LIGHT WEIGHT** — Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by 40%.
- **PERMANENT** — Does not disintegrate when wet, resists absorption. Will not shake down, is fire resistant and odorless.
- **EASY TO INSTALL** — Blankets may be applied to car wall in one piece, from sill to plate and from one side door to the other. Self-supporting in wall section between fasteners.
- **COMPLETE RANGE** — STREAMLITE HAIRINSUL is available ½" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings are available.
- **HIGH SALVAGE VALUE** — The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.



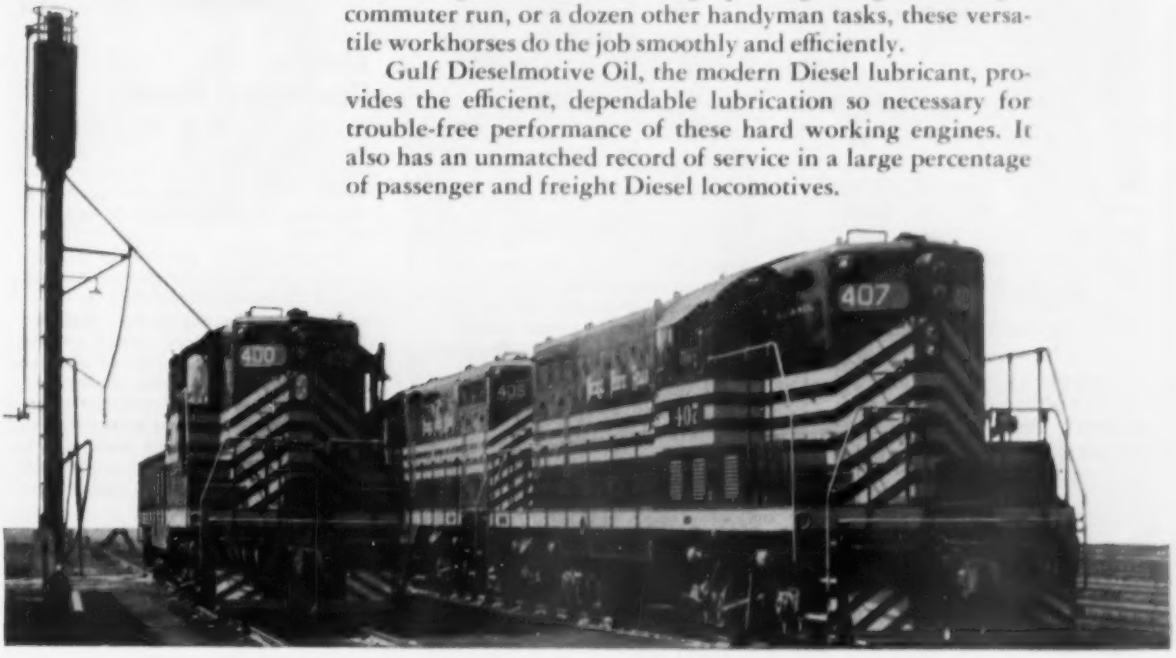
SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED.

for effective, efficient lubrication of Diesel road switchers

GULF DIESELMOTIVE OIL

When the job calls for fast action and economy, Diesel road switchers get the nod. Breaking up a large freight, making a commuter run, or a dozen other handyman tasks, these versatile workhorses do the job smoothly and efficiently.

Gulf Dieselmotive Oil, the modern Diesel lubricant, provides the efficient, dependable lubrication so necessary for trouble-free performance of these hard working engines. It also has an unmatched record of service in a large percentage of passenger and freight Diesel locomotives.



Here's how this top quality lubricant helps keep maintenance costs down, availability up:

1. Chosen for their ability to prevent hard carbon deposits in hot spots, the selected base stocks of Dieselmotive Oil also provide an oxidation resistance safety factor.
2. 100% solvent refining of base stocks (which removes undesirable constituents) guarantees greater stability and more effective bearing protection.
3. Superior additive response is obtained by carefully matching the additives to the base stocks. This insures clean rings, grooves, oil cooling passages, and a minimum of piston crown deposits.

Gulf Sales Engineers are always available to aid you in maintaining high standards of lubrication throughout your system. Write, wire, or phone your nearest Gulf office.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

New marketing policy for inspection equipment

Outright sale of angle beam search units for testing locomotive and freight car axles has been announced by Sperry Rail Service of Danbury, Connecticut. Formerly these were available only on an annual lease basis.

The units, used in conjunction with the ultrasonic Reflectoscope, enable railroads to inspect all areas of rolling stock axles without disassembly. Angle beam units now manufactured in 15.5°, 19° and 24° locate hidden defects in gear seat, wheel seat and dust guard areas of axles.

Ultrasonic axle inspection, already adopted by many major railroads, has rapidly become an accepted means of safety control. The angle beam search unit has made ultrasonic inspection of many components having unusual shapes both practical and economical. A glance at the adjacent advertisement will explain the use of the angle beam search unit in an ultrasonic test of a diesel axle, and may suggest a similar solution to some current testing problem of your railroad. If Sperry can assist you in providing more effective and economical mechanical inspection, please take advantage of the coupon under the ad on the opposite page.

Sperry

FIRST IN RAIL TESTING

SPERRY

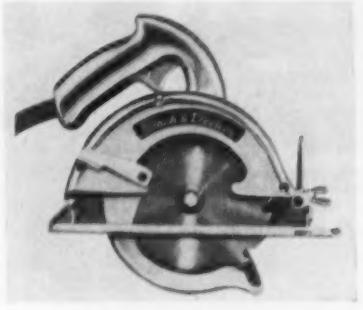
RAIL SERVICE

Danbury, Conn.

(Continued from page 108)

with high speed or carbide tools. Hardness can be increased by water quenching the deposit from 1,600 deg F.

For operation on either d-c, electrode negative, or a-c, this rod is available in $\frac{5}{32}$ in., $\frac{5}{16}$ in. and $\frac{1}{4}$ in. sizes. *Lincoln Electric Company, Cleveland 17.*



Heavy Duty Saw

This tool gives heavy duty power for the toughest of sawing jobs. Its 6½-in. blade will cut a 2 by 4 at 45 deg with blade to spare, thereby permitting many resharpenings. A switch guard prevents accidental tripping of the instant release switch, and an open end handle makes possible quick, easy gripping or release.

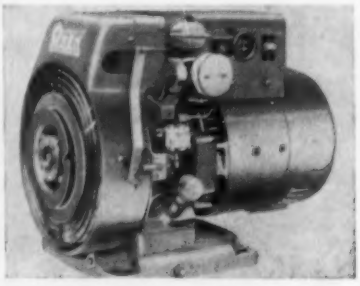
A built-in chip deflector keeps chips and dust from flying. The saw has an automatic telescoping blade guard that opens as each saw cut is started and springs closed when the cut is completed. The unit is fully adjustable for depth and angle of cut, and there is a calibrated quadrant for setting off any cutting angle. Air, drawn in for ventilation of the motor, is discharged along the line of cut, keeping it free of dust.

The saw has a maximum depth of cut of $2\frac{5}{32}$ in. at 90 deg and $1\frac{7}{8}$ in. at 45 deg. It contains ball bearings, heat-treated helical gears and a universal motor. *Black & Decker Mfg. Co., Towson 4, Md.*

Self-Sealing Freon Coupling

A self-sealing coupling, designed for use with Freon 12 and Freon 22, has been produced for use by the refrigeration and air-conditioning industry. The coupling is available in ¼-in. through 1½-in. sizes, and is said to provide a positive, leak-proof seal which does not allow air to enter while being connected or disconnected.

Manufacturers of air conditioning equipment are presently using these couplings. Condenser and evaporator units and their connecting tubing in various lengths are pre-charged with Freon at the factory, sealed with these coupling halves and shipped completely pre-charged. When the units are set in place, the lines are easily connected by mating the proper coupling halves, and the system is ready for operation. *Aeroquip Corp., 300 South East avenue, Jackson, Mich.*



Electric Generating Plant

This heavy-duty plant, Model 2LK, produces 2,000 watts, 60 cycle ac at 1,800 rpm, or 1,500 watts at 50 cycles in all standard frequencies and phases, and can take rough handling on mobile and portable jobs.

The generator is powered by a single cylinder, air-cooled, 4-cycle gasoline engine. A blower-cooled generator is direct-connected to the engine for permanent alignment. Self-contained manual starting models are equipped with recoil rope starter, mounted fuel tank, muffler, air-cleaner, terminal box and vibration dampeners. Electrically cranked remote starting models come equipped with mounted control box, exhaust tubing and muffler, air-cleaner, separate fuel tank and battery cables.

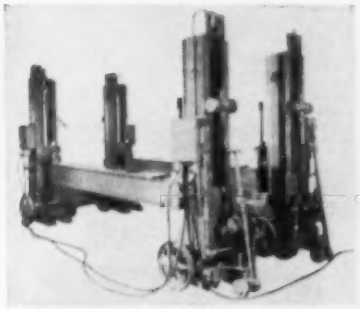
Optional equipment includes carrying frames, two-wheel dollies, automatic controls, emergency line transfer controls, receptacle plate kit and gas-gasoline carburetors. *D. W. Onan & Sons Inc., Minneapolis 14.*

Midget Chain Hoist

A small, 11-lb. fast and safe hoist capable of lifting 250-lb has a standard lift of 7 ft and a minimum distance of 9 in. between hooks. Extra chain is available for greater lifts. It is said that one man can lift a load of 30 ft in 1 min with the midget hoist. Each hoist is factory tested 100 per cent over rated capacity. The load is held by an automatic load brake at all times to reduce the possibility of accidents from falling loads. Ballbearing trolleys rated at 250-lb and made to fit all standard 3- to 10-in. I-beams are available. The trolleys have carburized, hardened wheels and grease seals for complete protection against dust and grit. Diameter of the tread of the wheel is 2½ in. and the weight of the trolley is only 12-lb. *Coffing Hoist Division, Duff Norton Company, Danville, Ill.*

Wire Rope Seize

A tight seize for cutting wire rope can be obtained by using Punch-Lok hose clamps. On stress-free pre-formed rope only one clamp is needed on each side of the cut. Seizing prevents any movement of the strands during the cutting operation. If wire rope is cut without first seizing, it can be thrown out of fabricated position and result in kinks or doglegs. Clamps can be removed after cutting, or left as a permanent seize. *Punch-Lok Company, 321 North Justine Street, Chicago 7.*



Jacks with Lifting Beams

Whiting electric portable jacks with lifting capacities up to 80 tons can be fitted with lifting beams. The lifting beam for each pair of jacks is supported by threaded bars that pass through the lifting brackets. Extra large, heavy-duty nuts carry the load. There are gaps in the base of the Whiting electric portable jack, to allow the lifting beam to be lowered into its floor slot. To gain additional lifting range, the lifting bars are threaded at their upper and lower ends to allow for double positioning of nuts.

The top surface of the lifting beam has rails for standard or narrow-gage tracks. This permits locomotives to pass over the beams when they are fully lowered into their floor slots. Portable jacks, when not in use, can be stored away from traffic and repair activity. The reversible electric motor on the jack can lift as rapidly as 9-in. per min under load. The height of lift can be 4-ft. 7-in. *Whiting Corporation, Harvey, Ill.*

Pressurized Penetrating Oil

Named Nu-Aero, a penetrating formulation, is designed for speed in loosening frozen fittings, nuts, bolts, sheaves, etc. Packaged in a pressurized container, it allows penetrating oil to be carried in tool boxes without danger of spillage.

The aerosol high-pressure stream eases of application in different positions, such as overhead or on distant points. The stream will shoot 4 ft in any direction. Addition of molybdenum disulfide to the

(*Continued on page 116*)

Sperry

REFLECTOSCOPE TEST BULLETIN

Sperry

Diesel Axles

Inspection of diesel axles has become one of the most important Mechanical Department uses of the Sperry Ultrasonic Reflectoscope.

Ultrasonic Reflectoscope inspection is positive and immediate—keeping pace with modern equipment maintenance requirements. Reflectoscope tests "in place" without disassembly. *Procedures are simple:*

1. Remove journal box cover – exposing end of axle. Coat axle end with oil to insure coupling between test crystal and axle.

2. Scan critical areas. Axle condition is indicated immediately on the screen of the Reflectoscope.

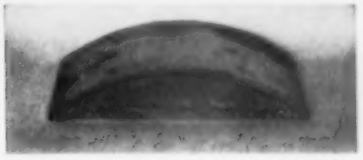
Results

Fatigue cracks in the journal, dust guard, wheel seat and gear seat areas are quickly detected by routine Reflectoscope testing.

Sawed axle showing crack in dust guard fillet area found with Reflectoscope.

Wheel seat cracks are easily revealed by Reflectoscope inspection.

Scope presentation of wheel seat crack.

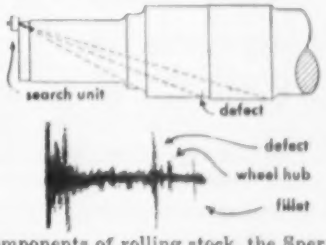


Axle section showing wheel seat defect.

How it Works

1. For diesel axle testing special "Angle-Beam" Search Units are used. These units project inspection beams at an angle instead of in a straight line. Angle-beam search permits testing of fillets and similar critical axle areas which cannot be inspected with a straight search unit.

2. The Reflectoscope screen presents a visual picture of any defect and its location in the material.



For testing axles, wheels and other vital components of rolling stock, the Sperry Reflectoscope has established a new criterion of efficiency and economy. In today's highly competitive transportation industry, Mechanical Departments will find that Sperry Rail Service offers the most advanced non-destructive inspection equipment yet developed for practical railroad applications. For complete information return the attached coupon.

Sperry

SPERRY RAIL SERVICE

Division of Sperry Products, Inc.

Danbury, Connecticut

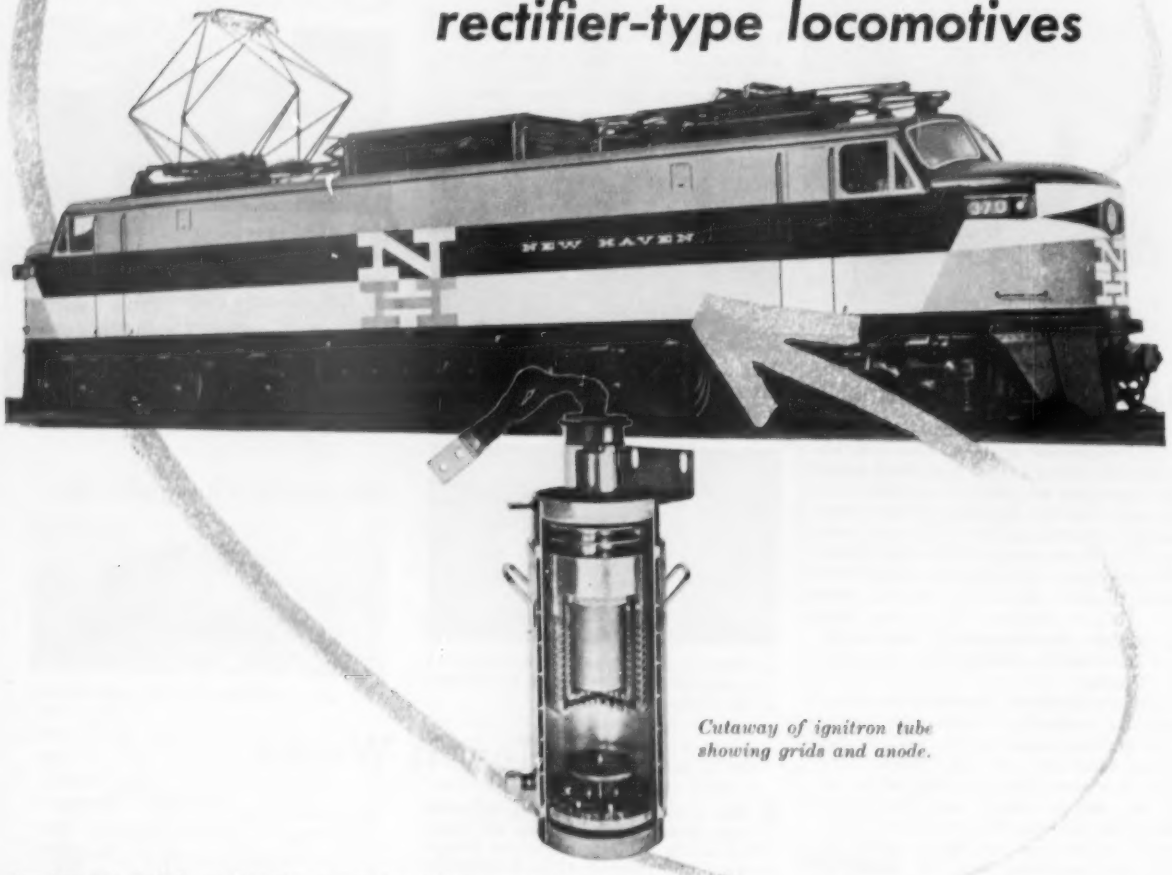
Send details of Ultrasonic inspection for railroad equipment.

Name_____ Title_____

Address_____

City_____ State_____

Speer carboneered IGNITRONS power New Haven's ten new rectifier-type locomotives



Cutaway of ignitron tube showing grids and anode.

Twelve G-E double-grid ignitron rectifier tubes supply d-c power to the New Haven Railroad's new 4000-horsepower locomotives. Each tube contains a Speer graphite shield grid, control grid, and anode. These parts are made of the finest grade graphite—free of impurities that cause arc-back and flash-over.

Precision-machined shield and control grids are designed to operate at voltages up to 500 volts—the anodes at voltages up to 4000 volts. Speer graphite electrodes withstand high overloads without melting. In addition, their coefficient of expansion is so small that there is no warp or distortion.

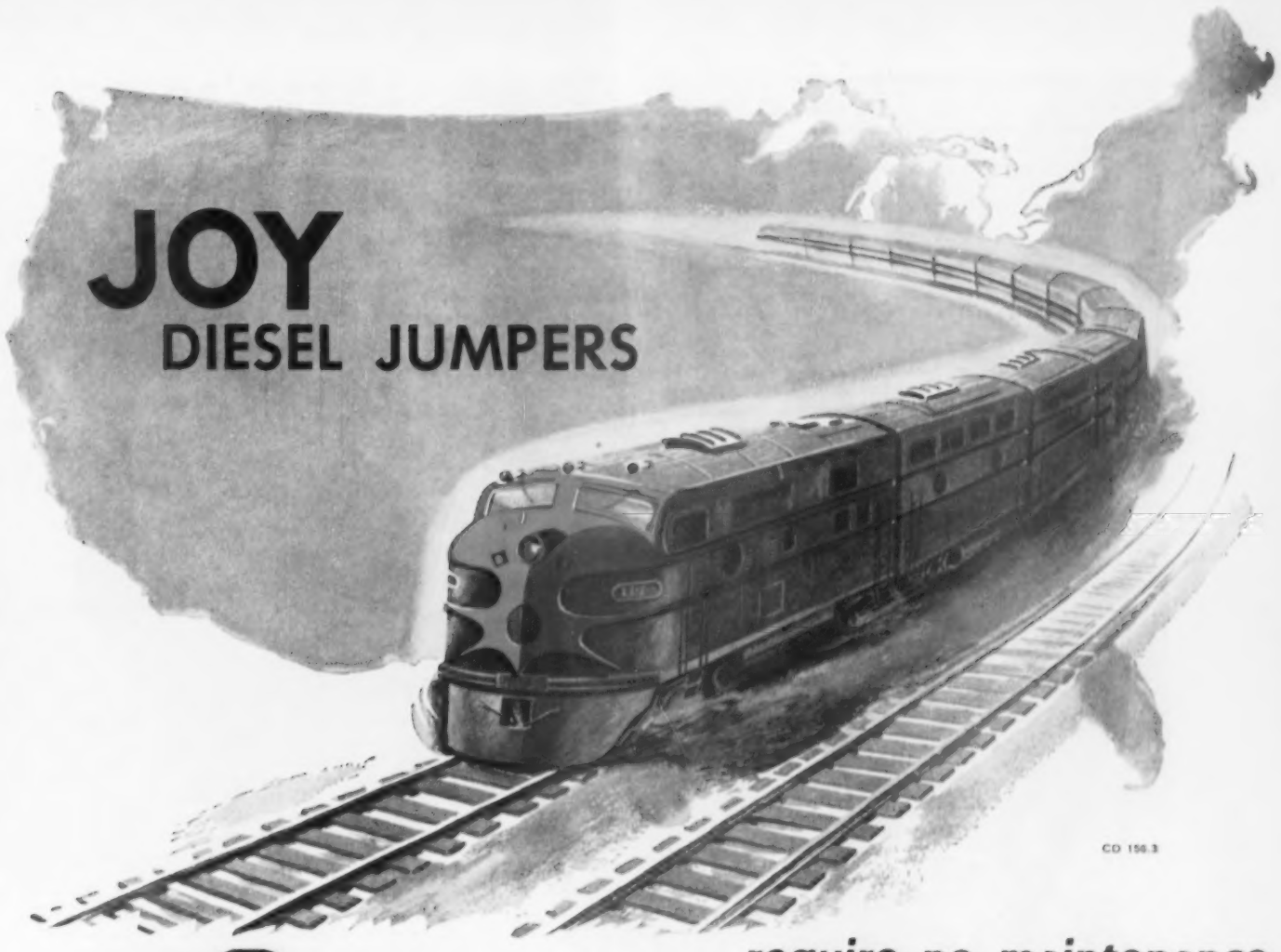
Applications of carbon products throughout industry are virtually limitless. Speer *Carboneering* has contributed vastly in fulfilling unusual design and material requirements. Let our experienced designers and engineers help you *Carboneer* a practical solution to your parts problem.

You be the judge of carbon's versatility

Carbon can be:	Carbon has:
Sawed	High corrosion resistance
Drilled	High heat transfer
Milled	Low electrical resistance
Broached	High thermal shock resistance
Turned	
Planed	Carbon is:
Hobbed	Not wetted by molten metals
Ground	Non-warping
Molded	Chemically inert
Extruded	Self-lubricating

SPEER Carbon Co.
St. Marys, Pennsylvania

JOY
DIESEL JUMPERS



. . . require no maintenance

JOY Multi-flex Diesel Control Jumpers *are guaranteed to provide at least two years of satisfactory maintenance-free service . . .* however, many in use today are more than five years old. If a mechanical or electrical defect develops in a JOY multi-flex jumper under normal operating conditions within two years, we'll replace it, without charge . . . and to make certain that this guarantee is faithfully fulfilled, each jumper is clearly dated when manufactured (see illus.). Supplied in standard lengths for 27, 21 or 16 wire circuits with silver-plated, replaceable contacts, JOY diesel jumpers are ready for use when received.

JOY MANUFACTURING COMPANY
Oliver Building, Pittsburgh 22, Pa.
In Canada
Joy Manufacturing Co.
(Canada) Limited, Galt, Ontario

27 to 27 Pole Multi-flex Diesel Jumper (illus.)

NOTE—Neoprene Hanging Sleeve

Dated for your protection

and here's why

1. One-piece, prewired Neoprene jacketed assembly, eliminates incorrect connections — a condition that has occurred when attachable heads are shop-wired.
2. JOY Diesel Jumpers are water-tight, shatter-proof and vibration resistant.
3. Silver plating protects contacts from corrosion and increases conductivity.
4. Protective Neoprene hanging sleeve can't slip off one-piece Jumper assembly.
5. Multiple cable grouping of wiring between plugs insures maximum flexibility.

Consult a Joy Engineer

for information on these products

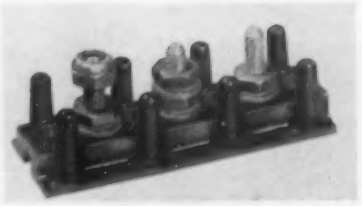
- Plugs and Receptacles for Air Conditioning and Battery Charging Requirements
- Dynamic Brake and Electric Airbrake Jumpers and Receptacles
- Inter-car Communication Jumpers and Receptacles
- Rotary Sand Dryer Screeners

JOY

SINCE 1851 - OVER A HUNDRED YEARS OF ENGINEERING LEADERSHIP

(Continued from page 113)

other active penetrants produces a product which both loosens and lubricates under extreme conditions. The oil will cut grease, rust, dirt and corrosion and can be applied to hot furnaces, stoves, steam or hot-water fittings. *Pressure Products Company, West Chester, Pa.*



Terminal Strips

Terminal strips featuring post-type barriers and studs for attachment of single or multiple terminal-ended or looped wires are said to provide a compact and lightweight unit which are adaptable to varying wiring requirements. The strips can be supplied of various molding compounds, either per MIL specifications or in commercial grades and with different types of hardware, base cuts, insulating strips, and bus strips.

These units are available with No. 6 studs in from 1 to 20 circuits, with No. 8 or 10 studs in from 1 to 16 circuits, and with ¼, 5/16 and ⅜ in. studs in from 1 to 8 circuits. They can be furnished in accordance with AN3436 standard and to other government and commercial specifications. *Buchanan Electrical Products Corporation, Hillside, N.J.*

5 *big advantages of*

PORUS - KROME

Good for the Life of your Engines

- INCREASES CYLINDER LIFE 3 TO 5 TIMES.
- INCREASES PISTON RING LIFE UP TO 50%.
- ELIMINATES STOCKING OF OVERSIZED PISTONS AND PISTON RINGS.
- DEFINITELY CONTRIBUTES TO REDUCED DOWNTIME FOR ENGINES.
- DEFINITELY CONTRIBUTES TO A REDUCTION IN LUBE OIL CONSUMPTION.

—Write Dept. F-1, VAN DER HORST CORP., OLEAN, N. Y.—

OLEAN, NEW YORK
HILVERSUM, HOLLAND

VAN DER HORST

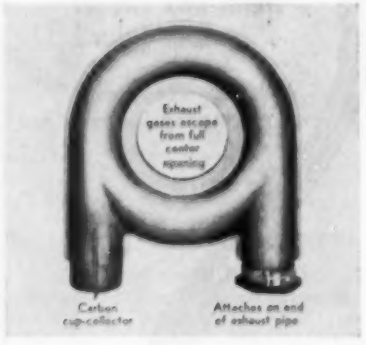
TERRELL, TEXAS
LOS ANGELES, CALIFORNIA*

*SparTan Engineering

Strippable Plastic Coating

MetalGuard, a strippable plastic coating, protects smooth or highly polished surfaces during fabrication, handling and storage. The coating after application dries to a tough, clear film that withstands all operations such as drawing, blanking, drilling, routing, and form rolling and protects against hazards of scratches, rust, grease and splatter by acids and alkali.

The product has a tensile strength of more than 2,500 lb per sq in. and an elongation up to 200 per cent. It can be sprayed on stainless steel, glass, vitreous enamel, chrome, nickel, decorative laminates and plated surfaces. It is also available in consistencies for brushing and dipping. *Guard Coatings Corporation, 8-05 43rd street, Long Island City, N.Y.*



Spark Arrestor

This unit, attached to the end of the exhaust pipe, is designed to trap incandescent sparks from the exhaust of internal-combustion engines. Employing radiating force, the hot carbon particles are carried to a cup-collector for periodic disposal of

carbon. Exhaust gases escape through a large central opening.

In appearance the arrestor resembles a circular tube with a tangent entrance for the exhaust gas. Another tangent tube to which is attached the removable collector-cup, is for the hot carbon particles. Inside the circular tube is the central slot that permits escape of gases.

The manufacturer claims that the unit built of No. 302 stainless steel, has proven effective where fire hazards from sparks are greatest. *Erickson Products Co., 43 Dore street, San Francisco.*

Three Dimensional Fabric

Flat woven, Trilok becomes permanently three dimensional when dipped in boiling water. The fabric, woven with polyethylene yarn and conventional textile fibres, forms puffs when the polyethylene is shrunk. The polyethylene, which runs lengthwise in the material, can shrink as much as 55 per cent, while the fabric may be from 1/64 in. to 1 in. thick.

The fabric, according to the manufacturer, is not totally compressible under a person's weight and will not collapse or flatten out under long periods of wear or compression.

The conventional yarns—cotton, wool, silk, rayon, nylon, mohair, etc., or combinations of these—run both lengthwise and crossways in the new fabric. Since their maximum shrinkage, from 8 to 12 per cent, is negligible compared to that of the polyethylene, they buckle when the polyethylene shrinks. Trilok can be produced as a single, double or triple fabric. *United States Rubber Company, 1230 Avenue of Americas, New York 20.*

Welder Remanufacturing

The remanufacture of old welding units on a production line basis is helping metal-working plants and maintenance shops

Unretouched Photo Proves Effectiveness of Cleaning Method!

Picture your cleaning problem! Does your present method of diesel engine parts cleaning produce such effective results in less than 20 minutes? If your answer is NO, find out about the Magnus Method of diesel parts cleaning.

Magnus RR-755 used in a No. 8 Magnus Aja-Dip Machine produces the fastest, most effective results as proved by the two diesel engine heads in the photograph above. Write to Magnus, 77 South Avenue, Garwood, N. J., for the copy of the 77 page illustrated Railroad Cleaning Manual that gives complete facts for every railroad cleaning job.

Magnus—a world-wide organization specializing in cleaning and protection of all surfaces.

magnus

RAILROAD DIVISION
MAGNUS CHEMICAL CO., INC.

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on coupon below to receive desired information. Requests will be forwarded direct by the manufacturers.

1. MOTIVE POWER BATTERIES. *C & D Batteries.* 52-page brochure "C & D General Service Manual, Motive Power Batteries" in 5 general sections describes and illustrates complete line of motive power batteries; includes list of representatives.

2. ADHESIVES, COATINGS, AND SEALERS. *Minnesota Mining & Mfg.* 12-page illustrated catalog "Adhesives, Coatings, Sealers" lists properties and applications of wide variety of these items.

3. SILICONE RUBBER PRODUCTS. *Garlock Packing.* 8-page bulletin (AD-147) "Garlock Silicone Products Including Silicone Sponge" describes, illustrates and points out applications of silicone rubber products.

4. FLUIDS & LUBRICANTS. *Carbide & Carbon Chemicals.* 52-page booklet (6500D) describes, illustrates, gives properties, applications and characteristics of Ucon synthetic fluids and lubricants.

5. EYE PROTECTION. *Watchemoket Optical.* 12-page bulletin (200) describes Watchemoket line of eye savers; includes illustrations, specifications, advantages of optical plastics.

6. STORAGE EQUIPMENT. *Precision Equipment.* 16-page catalog describes, illustrates, gives prices on steel shelving, lockers and other storage and maintenance equipment.

7. ACID-RESISTANT APPAREL. *Worklon, Inc.* 16-page reference manual (1956 Catalog) describes, illustrates, lists prices of "Acid and Caustic Resistant Industrial Apparel of Orlon and Dynel by Worklon."

8. INSULATED CABLES. *Hazard Div. Okonite.* 48-page data book (H-463) describes Keystone heat-resistant cable; includes test results for Keystone butyl rubber insulation under conditions of high heat and extreme moisture; contains tables, formulas, graphs.

9. COMPRESSION FITTINGS. *Dresser Mfg.* 12-page brochure describes, illustrates, gives specifications on Flexible Compression Fittings, gives uses on steel piping and copper tubing, diesel locomotives and irrigation piping.

10. HOSES. *Aeroquip.* 64-page Industrial Catalog (200) covers full range of Aeroquip products (hoses, fittings, couplings, adapters); profusely illustrated contains complete engineering data.

11. BATTERY WATER. *A. E. Tomkin.* 8-page folder (series B56) contains general description on use and operation of Hydrion battery-water units for direct conversion of ordinary tap-water to pure battery water without heat or power; includes specifications and performance data.

12. GRINDERS. *Gardner Machine.* 16-page catalog (2H30-55) describes, illustrates newly designed Gardner 2H30 precision horizontal double spindle disc grinder. 8-page catalog (2V-55) describes, illustrates new Gardner 2V18 precision double disc grinder. (*Please write in catalog number desired on coupon below.*)

13. D-C MOTORS. *General Electric.* 12-page publication (GEA-6068) covers complete line of fhp direct-current motors and equipment for direct application and built-in use; includes typical applications, product features, ratings and specifications.

14. BRONZES. *International Nickel.* 28-page folder (3157) "Engineering Properties and Applications of Ni-Vee Bronzes," with tables, graphs, photos describes five basic Ni-Vee bronzes for industrial uses.

15. CLEANING MATERIALS. *Oakite Products.* Revised 16-page booklet (F 8143R 4) "How to Use Oakite Solvent Detergents For Removing Carbon, Grease, Dirt, Paint" tells how solvent detergents without heat removed carbonized grease and oil and certain types of paint, and provide temporary rust protection after cleaning.

16. CORD & CABLE GRIPS. *Pyle-National.* 6-page pamphlet (629) describes the water-tight line of high-lustre finished sealing grips for portable cords and cables.

17. BRONZES. *W. W. Alloys.* 32-page booklet (15.100-1) "W W Premium Quality Aluminum Bronzes" gives complete engineering data on each grade of W W aluminum bronze, includes specifications, properties, applications.

18. AIR TOOLS. *Aro Equipment.* 40-page catalog (62) features complete line of Aro air tools, air hoists and automation tools; includes descriptions, features and handy reference data.

19. LATHES. *South Bend Lathe Works.* 84-page catalog (5600) "South Bend Anniversary Catalog—50th Anniversary, 1906-1956" describes, illustrates, gives specifications on the South Bend line; shows prices.

20. REFRIGERATION EQUIPMENT. *Nor-Lake.* 2-page catalog sheet describes, illustrates, gives specifications on the self-contained packaged refrigeration unit; includes photos, cutaway drawings, installation instructions.

Reader Service Department — **MARCH, 1956**
Railway Locomotives and Cars
30 Church St., New York 7, N. Y.

Please send literature circled below:

1	2	3	4	5	6	7	8	9	10
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Also, please send me additional product information as follows: (company, product & page number) .....

Name ..... **Title or Position** .....

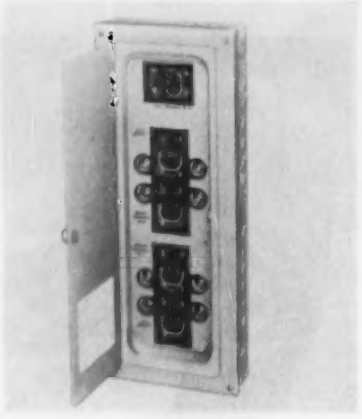
Company .....

Address .....

City ..... **Zone** ..... **State** .....

meet tightening demands on output. The program supplements normal preventive maintenance with a planned system to bring older welders up to peak production efficiency.

The machines, after going through the remanufacturing production line at half the cost of a new welder, will give another full service life and carry the standard new machine guarantee. *Lincolnditioning Division, Lincoln Electric Company, Cleveland 17.*



Fusible Service Entrance Panels

Two fusible service entrance panels with 100-amp main lugs, designed to supply adequate circuits and wiring protection, are suitable for the connection of several 240-volt loads as well as a large number of 120-volt circuits for lighting and convenience outlets. They are rated for 120/240 volt ac, single-phase, 3-wire service.

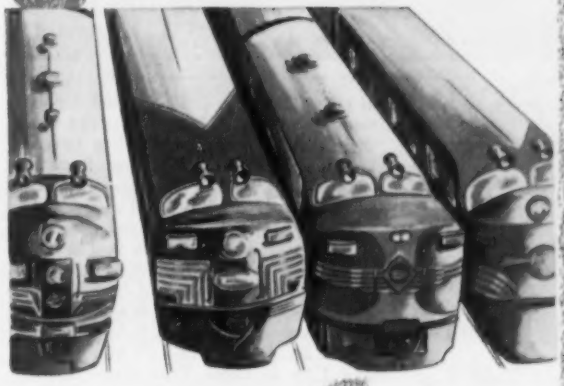
One of the units has four fuse pullers and either eight- or twelve-plug fuse branch circuits. The other unit is equipped with five fuse pullers and eight-plug fuse branch circuits.

Installation is simplified by straight-in wiring at line and load terminals to eliminate looped wire ends and a slide-out interior that can be removed to give extra room for pulling in wires. Silver-plated copper-current-carrying parts insure cool operation and both box and front are Bonderite coated to resist corrosion. The panels are designed for either surface or flush mounting. *Trumbull Components Department General Electric Company, Plainville, Conn.*

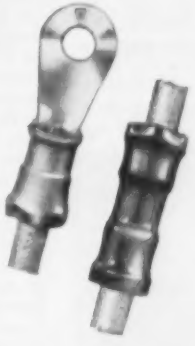
Hydraulic Grinding Machines

These grinding machines Models 6 in. R, 10 in. L, 10 in. R and 14 in. L, are said to fill a need in metalworking shops for a center-type grinder capable of producing fine finishes and close tolerances of ac-

Right from the word go!



. . . There is a reason why most manufacturers of Diesels and rolling stock specify AMPLI-BOND for electrical connections in wire sizes from #8 to 4/0. It's because AMPLI-BOND Terminals and Connectors are designed to fill the specialized requirements for railway use. They are rugged enough to stand up under constant use and pre-insulated to eliminate wrapping, tape or spaghetti. The rough vinyl insulation is bonded to the terminal barrel; won't slip off or crack under crimping pressure. Hand Hydraulic and DYNA-CRIMP tools have positive crimping action to make fast, high tensile strength crimps.



Ampli-Bond

Terminals and Connectors and crimping tools for wire sizes #8 to 4/0.

AMP

AIRCRAFT-MARINE PRODUCTS, INC.
2100 Paxton St., Harrisburg, Pa.

In Canada:
Aircraft-Marine Products of Canada, Ltd.
1764 Avenue Road
Toronto 12, Ontario, Canada
©A-MP®

AN OLD FAVORITE

and 2 new Power Drives

by TOLEDO

National Standard for Quality Pipe Tools

SMALL RATCHET PIPE THREADERS

Ideal for close corner work—instant change, drop-out die head—cuts easy with finest precision made tool steel dies—easily removed for regrinding—up to 2". Excellent for use with power drives.

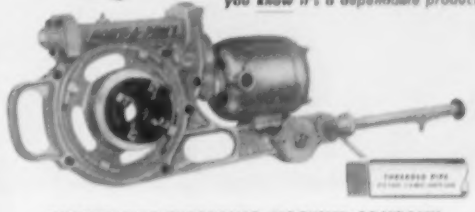
NO. 78 PORTABLE POWER DRIVE

Lightweight powerful weighs only 75 lbs.—sturdy folding legs built like a machine tool. See it at your supplier's today. Handles ¼ to 2" pipe.

NO. 68 TOLEDO PORT-A-PONY

A 26 lb. power drive—carry it anywhere. Threads, cranks, pulls, lifts—versatile and powerful. Add power to hand equipment. Write for complete information.

If it bears the famous TOLEDO label you know it's a dependable product.



TOLEDO PIPE THREADING MACHINE COMPANY
TOLEDO 4, OHIO

BUILDERS OF THE WORLD'S FINEST PIPE TOOLS

TOLEDO

PIPE THREADERS • PIPE WRENCHES • PIPE MACHINES

Lewis sealtite car bolts

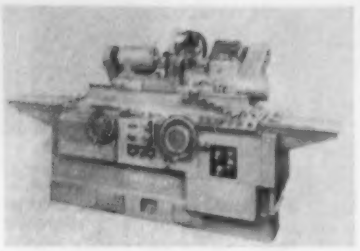
More than 85% of America's Class I railroads use Lewis Sealtite products. Designed to do a better job . . . to last longer . . . to meet the most exacting specifications. Specify Hot Dip Galvanized, Zinc finish for Double-Life and economy.

All products are manufactured in the U.S.A. to A.S.T.M. specifications.

Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF QUALITY

Sealtite bolts are available with Lokite Nut (2 (shown), or std. sq. and hex.



curacy in a routine manner. The two sizes followed by the letter L are light types with extra swing capacity to accommodate a flange or projecting arm on the workpiece.

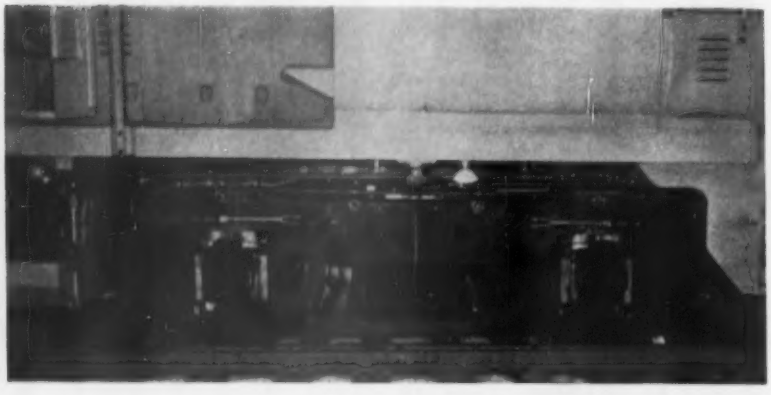
Filmatic bearings have been retained for the grinding-wheel spindle. Lubrication of these bearings is automatic, with the circulating filtered oil protected by an electrical pressure switch. Automatic grinding wheel balancing is included as standard equipment. Controlled by a lever, the grinding wheel can be balanced within 20 sec without removing the wheel mount from the machine.

Control elements and levers are centrally located in front of the machine. One movement of the hand on the start-stop table traverse starts and stops the table traverse, starts and stops the rotating work and starts and stops the cutting fluid flow.

Power table traverse, hydraulically operated, provides variable traverse rates from 3 in. per min for truing to more than 200 in. per min through a knob control. Length of table traverse may be automatically dog controlled from the full rated stroke to as short as 3/32 in. Infeed or cross traverse for the wheelhead is controlled from the front of the machine by means of a large handwheel. Hand adjustments as low as 50 millionths on the work diameter can be accomplished. Automatic pick feed at table reversal is variable from 0.0002 in. to 0.005 in. diameter reduction.

Headstocks for the 6 in. R and 10 in. L machines are powered by a ½-hp ac motor. The 10 in. R and 14 in. L's are powered by a 1 hp ac motor. Four spindle speeds are available, selected by means of a V-belt riding on 4-step pulleys. The 6 in. R and 10 in. L units are built in 18 and 30 in. lengths while the other devices are built in 18, 36, 48, 72 and 96 in. lengths. Power ratings for the five larger sizes are 15-hp grinding-wheel spindle drive motor and ½-hp hydraulic motor. For the smaller sizes; 7½hp grinding wheel spindle drive motor and 1 hp hydraulic motor.

Thirty-one extra equipment items are available for these machines, including automatic electric gage sizing with continuous automatic compensation; push button automatic infeed attachment; gap eliminator; hydraulic automatic behind-the-wheel profile truing; radius truing; right angle wheel truing; grinding wheel spindle reciprocation; hydraulic footstock and others. *Cincinnati Grinders Incorporated, Marburg avenue, Cincinnati 9.*



Locomotive Truck

New truck applied to EMD switchers delivered to the Illinois Terminal is expected to be simpler to maintain than previous models while giving a comparable ride because of the elimination of the swing hangers and elliptic springs. The all-coil-spring truck is similar in principle to the type used on the SD-9 road switcher. It is fully flexible with controlled lateral movement 1¼ in. each way. Separate bolster springs give increased vertical deflection for a soft ride. The new truck can be used interchangeably on existing switchers by making minor changes in the piping to eliminate clearance problems with underneath-mounted equipment on the underframe.—*Electro-Motive Division, General Motors Corporation, La Grange, Ill.*

Polyethylene Bags

Small industrial parts can be easily stored and effectively handled in these reusable bags fitted with self-locking closures. Both the film bag and the closure are made of Bakelite polyethylene. Light pressure will lock the edge of the closure together, sealing the contents in the bag against moisture, air and dirt. Contents, including tags or part numbers, are clearly visible through the transparent film to facilitate sorting and inventories.

These bags are produced in shapes and sizes to fit different parts, and are also made in multiple-pouch form, separated by sealed partitions to prevent contact between parts. *Polyfab Company, 3511 Eagle Rock boulevard, Los Angeles 65.*

SUPPLY TRADE NOTES

(*Continued from page 22*)

J. W. S. Davis

ALCO PRODUCTS, INC.—*Joseph W. S. Davis* has been appointed regional manager-western region, succeeding Charles F. Venrick, resigned.

■

TOLEDO PIPE THREADING MACHINE COMPANY.—The following have been appointed regional sales managers: *Blake Wilson*—north central area, Chicago; *Marvin Cox*—western region; *R. W. Warnke*—east north central territory and Eastern Canada; *W. L. Gahman*, east coast region of New England and Middle Atlantic states; *H. R. Strouse*—Southeastern territory, including Texas, Oklahoma, Louisiana and Mississippi.

■

C. V. Blackburn

STRAN-STEEL CORPORATION.—*C. V. Blackburn* has been appointed vice-president, sales, succeeding *J. E. Bowen*, retired. Mr. Blackburn was previously sales manager, consumer products, Wiring Device Department, General Electric Company.

A $2,000,000 expansion program is under way at the Terre Haute, Ind., plant of Stran-Steel, a unit of the National Steel Corporation.

■

SPEER CARBON COMPANY.—*Dr. Lawrence M. Liggett*, formerly research supervisor, Wyandotte Chemicals Corporation, has been appointed manager of research for Speer at St. Marys, Pa.

Obituary

ERNEST W. BECK, 68, president of Beck & Blatchford, Inc., died January 20 at Chicago.

■

JERRY D. BRANDON, SR., chairman, director and former president of Brandon Equipment Company, died January 5.

■

JAMES E. DAVENPORT, 68, who retired in 1946 as vice-president, engineering, development and research, American Locomotive Company (now Alco Products, Inc.), died of a heart attack at his home in New York, January 24. Most of his career was spent with the New York Central, where he was assistant chief engineer motive power and rolling stock at the time he joined Alco in 1940.

■

CLYDE A. SATTLEY, 90, retired Chicago regional manager of the Electro-Motive Division of General Motors Corporation, died December 28 at Santa Fe, N. M.

■

A. S. BENTON, representative in the Atlanta, Ga., office of the Westinghouse Air Brake Company, Air Brake Division, died January 15.

Good for

another

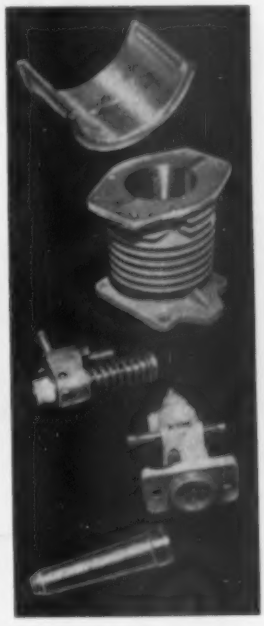
300,000 MILES!

Restore worn diesel parts

(EMD, Alco, Baldwin, Fairbanks Morse)

LINERS
PISTONS
BEARINGS
INJECTORS
CRANKSHAFTS, etc.

chromed, ground, honed and lapped to standard size



When vital diesel parts become worn, restore them to new (even better than new) condition at less than new cost. We first Magnaflux-test each part, then hone and replace worn-away metal with wear-resistant chrome or bearing material. The part is then ground, honed and lapped to original size. The result—many, many more miles of service.

This partial list gives you an idea of the scope of our reconditioning service; *main and air compressor crankshafts; camshafts; bearings; pistons, cylinder heads; cylinder liners; air compresor cylinders; fuel pumps; injectors; barrels and plungers; Alco nozzle holders; suspension truck bearings.*

We also design and build all types of cutting tools, both hi-speed and carbide. Worn-out tools salvaged and remanufactured. Consider Railroad Parts Service "your other shop." We are always ready when you need us.

RAILROAD PARTS SERVICE CO.

2980 W. Davison Ave., Detroit 38, Mich.

Ray W. Freikschat & Son, 8 S. Michigan, Chicago.
Charles Chapman, 205 Rose Bldg., Windsor, Ont., Canada.

WELDING IS EASIER WITH

HELIARC

Trade-Mark

TORCHES

WELD ALL THESE METALS WITHOUT FLUX

aluminum
magnesium alloys
stainless steel
HASTELLOY alloys
Everdur alloys
cast iron
MULTIMET alloys
brass and bronze
copper
Inconel alloy
mild and low-alloy steel
silicon-copper alloys
nickel and nickel-base alloys
silver and silver-cladding

HIGHEST WELD QUALITY

GREATEST WELDING SPEED

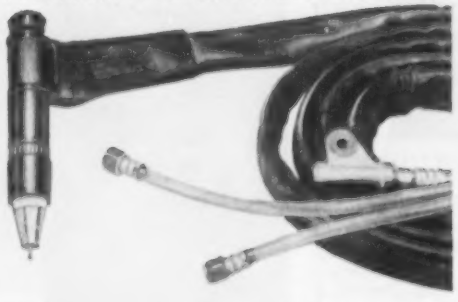
MINIMUM WELD FINISHING

HW-9
for light welding
Air-cooled—
75 amp. a.c.h.f., d.c.s.p.
Electrode sizes:
.020 to 1/16 in.

HW-10
for general welding
Water-cooled—
300 amp. a.c.h.f.,
d.c.s.p., d.c.r.p.
Electrode sizes:
.040 to 1/8 in.

HW-12
for heavy-duty welding
Water-cooled—
500 amp. a.c.h.f.,
d.c.s.p., d.c.r.p.
Electrode sizes:
.040 to 1/4 in.

HW-8
for spot-welding
Water-cooled—
250 amp. a.c.h.f., d.c.s.p.
Electrode sizes:
1/8 to 5/32 in.



HW-13
for mechanized welding
Water-cooled—
500 amp. a.c.h.f., d.c.s.p.
Electrode sizes:
.040 to 1/4 in.

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

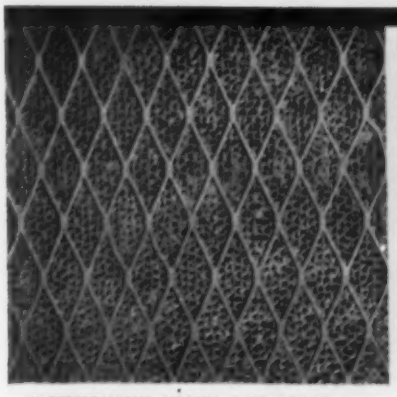
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

"Hastelloy," "Heliarc," "Linde," and "Multimet" are registered trade-marks of Union Carbide and Carbon Corporation.

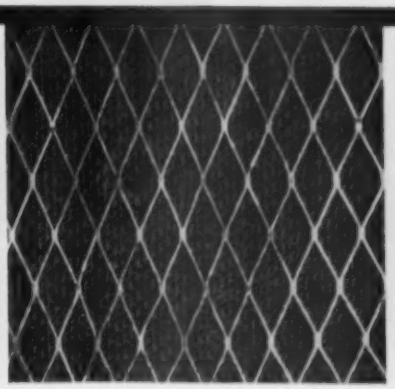
Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol . . .

Mobil Air Filter Saturant*

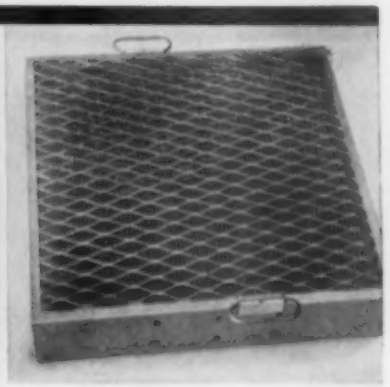
gives you top performance like this . . .



EXCEPTIONALLY HEAVY DIRT LOADS can be held by locomotive car body filters. Mobil Air Filter Saturant keeps filter surface oil-wet, ready to collect even more dirt.

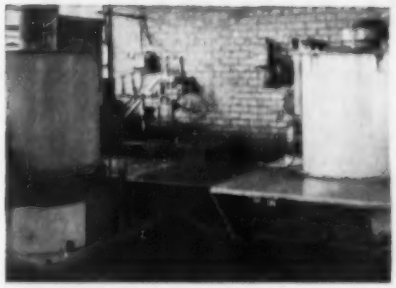


DIRT DOESN'T PASS! Note oil-wet, engine-room side of same filter. Gel-like structure prevents migration or drip. And, the proof—

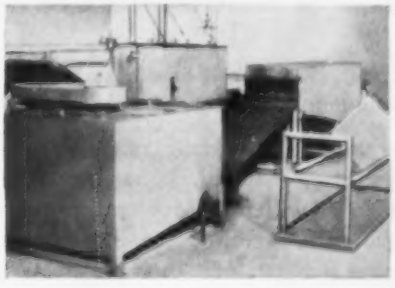


ENGINE INTAKE FILTER STAYS CLEAN!

plus—the Easiest, Lowest-Cost Handling in the Filter House!



APPROVED by all major manufacturers of filter-processing equipment.



CHECK THESE SPECIAL ADVANTAGES:

- Low temperature application provides for big steam savings!
- Use only the amounts needed for your dust conditions. Applications are easily controlled! Does not hang on frames!
- No odors to worry about in the filter house! No odors to worry about in passenger cars!
- No wash-resistant thickeners. Dirty filters clean easier!
- Good water separation characteristics prevent machine trouble!

Railroad Lubricants

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

RAILROAD DIVISION

26 Broadway, New York 4, N. Y.
59 East Van Buren Street, Chicago 5, Illinois

*Patent applied for.

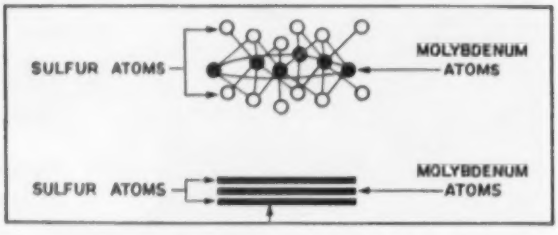
Effective lubrication of torsion suspension bushings of heavy duty trailers has been a maintenance problem with many truckers. The bushing at the left was removed still in good condition after 160,000 miles of service. This bushing was lubricated with a chassis grease containing Moly-Sulfide additive. The bushing at the right, lubricated with ordinary chassis grease, needed replacement after 35,000 miles of service.

How Moly-Sulfide additives EXTEND EFFECTIVE LUBRICATION

Why Moly-Sulfide additives are used in lubricants by trucking fleet operators, railroads, aircraft and automotive manufacturers, oil well drillers and steel mills.

Moly-Sulfide has six characteristics which make it an ideal lubricant additive wherever mechanical action wipes or shears off the hydrodynamic film.

1. Because of its affinity for metals, Moly-Sulfide readily forms a film on metal surfaces.
2. Moly-Sulfide has a low coefficient of friction.
3. It has a high factor of durability.
4. Moly-Sulfide has a thermal stability of −100°F. to +750°F.
5. It has a high chemical resistance to acids, alkalis and water.
6. It withstands high pressures, having a low shear strength and a high film strength.



Above, structural diagram of the Moly-Sulfide molecule. Below is a functional illustration of the laminar structure. Each lamina is composed of a layer of molybdenum atoms with a layer of sulfur atoms on each side.

What is Moly-Sulfide and how does it function in lubrication?

Mined in Colorado as molybdenite, purified Moly-Sulfide is a lead-grey material. It has a laminar molecular structure, with the Moly atoms sandwiched between layers of sulfur. (See illustration.) The sulfur atoms have an affinity for metal and

bond readily to metal surfaces, giving the film a *low shear strength*. This affinity is caused by a strong intermolecular bond between sulfur and metal. The lubrication results from the easy slippage of sulfur-to-sulfur atoms. As an additive to lubricants, the *Moly-Sulfide will readily form a film and when a grease or oil film is wiped away or sheared off, the Moly-Sulfide film sustains lubrication until a petroleum film reforms.*

Truck and passenger car builders and operators are making wide use of Moly-Sulfide greases for difficult lubrication jobs.

Lubricants containing Moly-Sulfide additive have over 30 established uses in the automotive, aircraft, railroad, oil drilling and steel industries.

Since Abraham Lincoln's time, railroads have been faced with a serious, recurring, *expensive* problem: hotboxes. Right now more than 14 million journal bearings are carrying heavy loads at high speeds on American railroads. These railroads have to deal with an average of 183,000 hotboxes a year at a cost of some $90,000,000.

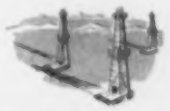
Initial field tests by at least three leading railroads have shown hotboxes can be reduced materially by the use of grease containing Moly-Sulfide. A way has been devised to apply greases containing Moly-Sulfide on the journals of railroad equipment. This application is supplemental to the oil waste system and as a result the Moly-Sulfide films that are formed sustain lubrication until the oil film is reestablished.

American automobile and truck manufacturers and their customers are now using lubricants containing Moly-Sulfide additive in at least 14 different applications. These include chassis points, ball joint suspensions, torsion suspension assemblies, fifth wheels, shackle bolts, king pins, valve stems, automatic window mechanisms, wind-shield wiper mechanisms, seat adjusters, drive shaft splines.

In aircraft, Moly-Sulfide is added to aircraft greases. In jet engines under exacting conditions of temperature and pressure it is used on turbine shafts, splines and gear reduction units.

In other industries, Moly-Sulfide is being used in lubrication jobs which formerly presented serious difficulties. A Florida cement plant is using gear compound containing Moly-Sulfide to lubricate rack gears and a Michigan manufacturer uses Moly-Sulfide as an additive to drawing compounds for drawing stainless steel hub caps. In New York a baker of crackers and cookies is using Moly-Sulfide grease for lubrication of oven chains which must operate at high temperatures. In Louisiana an oil well drilling contractor is using Moly-Sulfide additive in tool joint compounds. He reports that disjointing when drilling below 15,000 feet is no problem now: no galling, welding or stripped threads.

Aircraft manufacturers are using Moly-Sulfide greases on many types of ball and joint suspension lubrication.



Oil well drilling contractors are using Moly-Sulfide additives to tool joint compounds.

Lubrication engineers are offered information and help in evaluating the use of Moly-Sulfide as an additive to lubricants by the Climax Molybdenum Co.

Currently Moly-Sulfide is being investigated by many petroleum research laboratories and lubricant users. They are interested in studying, under practical working conditions, the ability of Moly-Sulfide to increase effective lubrication.

If insuring effective lubrication is a problem facing your company, Moly-Sulfide additives may be a solution. Climax Molybdenum Company is the principal source of this product. If you need authoritative information, please get in touch with us and we will be pleased to send you literature on Moly-Sulfide and the sources of supply for experimental lubricants containing Moly-Sulfide.

Department 59
CLIMAX MOLYBDENUM COMPANY
500 Fifth Avenue, New York 36, N. Y.

Please send me the following:

Literature
1. "Moly-Sulfide, Lubricant Additive" ☐
2. "Moly-Sulfide in Chassis Grease" ☐
3. "Moly-Sulfide Specification and Properties" ☐

List of Sources for
1. Railroad Greases ☐
2. Chassis Greases ☐

Sample — One-ounce tube of Moly-Sulfide ☐

Name .....

Position .....

Company .....

Address .....

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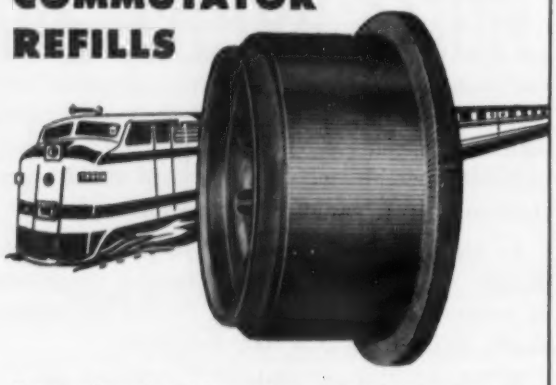

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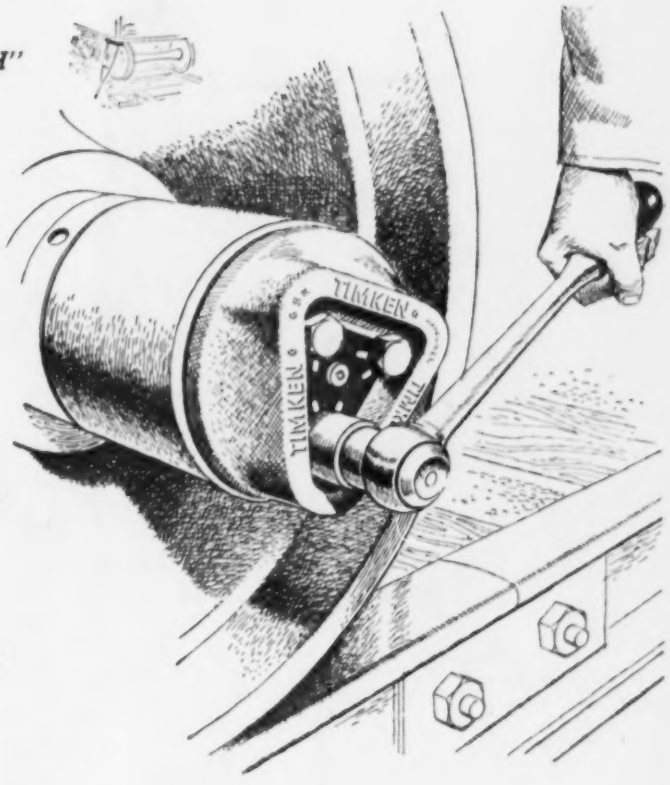
YOU CAN'T CURE WITH A "CRUTCH"

The one sure Cure for the Hot Box Problem: Timken® Bearings

...and they pay for themselves over and over and over in operating and maintenance savings



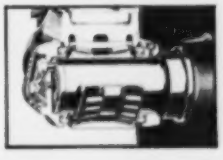
USE of "crutches"—devices attempting to improve friction bearing performance—will never answer the hot box problem. The one sure *cure* is Timken® tapered roller bearings, because they eliminate the *cause* of hot boxes—the friction bearing itself.

EXTRA SAVINGS, TOO With Timken bearings, you also slash the cost of bearing inspection and lubrication. Costs that hang on even with crutch devices. Timken bearings cut terminal bearing inspection time by 90%, reduce lubricant costs as much as 95%. The fact is, the new Timken heavy-duty type AP (All-Purpose) bearing assembly will go three years without the addition of lubricant. When all railroads go "Roller Freight", they'll save more than $190 million a year, earn an estimated 22% net annual return on the investment.

THE TAPER DOES IT Doing away with the hot box problem is a simple job for Timken bearings. They roll the load instead of sliding it. There's no metal-to-metal sliding friction as with friction bearings. And the tapered design makes Timken the only roller bearing you can *be sure* will *cure* the hot box problem *and* reduce operating and maintenance costs to the lowest possible point. The taper in Timken bearings prevents lateral movement. There's no pumping action—less lubricant is required. There's no scuffing or skewing—bearings last longer.

And to be sure of the quality of Timken bearings from melt shop to final bearing inspection, we make our own steel. We're America's only bearing manufacturer that does.

PRACTICAL CONVERSION PLAN USED Figuring in the extra cost of buying and maintaining "crutch" devices that don't cure, it's easily seen that the difference in price between friction and roller bearings is smaller today than ever. And now a program adopted by one major American railroad promises an even greater reduction. This railroad has put into effect a practical program for converting to "Roller Freight". It works like this. Every freight car coming into the shops for major repairs is converted to roller bearings. This simple, workable plan 1) facilitates a steady shop and labor schedule, keeping installation costs to a minimum, 2) allows the railroad to absorb the cost for its conversion to roller bearings over a period of years.

Instead of trying to shore up friction bearings with costly "crutches", *cure* the hot box problem and gain maximum savings in operating and maintenance costs with Timken bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

Only TIMKEN® bearings cure the hot box problem and cut operating and maintenance cost to a minimum